

## Short Communication

### FIRST RECORD OF THE GENUS *SIPHONARIA* SOWERBY, 1823 (MOLLUSCA: GASTROPODA: SIPHONARIIDAE), AN ASSOCIATED ORGANISM OF OYSTER FROM COASTAL ZONE OF SUNDARBANS, WEST BENGAL, INDIA

#### INTRODUCTION

The Sundarbans is bestowed with a wide range of natural forest and aquatic resources, offering the largest mangrove concentration with a great biodiversity and the only mangrove tiger-land in the world. A number of rare and endangered species have been recorded in this region. The Sundarban Biosphere Reserve is one amongst the three marine biosphere reserves in the country. The main objective of the marine biosphere reserve is protection, conservation and judicious utilization of the marine environment. The reserve has an area of 4,263 sq. km of mangrove forest. The Sundarbans Tiger Project and National Park and the Wildlife Sanctuaries are located within the area. Molluscan resources exist at innumerable places along the coasts of India and are exploited in varying degree of intensity but the diversity and biological aspects of the major species of molluscs of economic importance have been studied only at a few areas in the last few years. Very limited studies have been attempted on *Crassostrea gryphoides* Schlotheim, 1813 and *Saccostrea cucullata* Born, 1778 from mangrove and in the vicinity regions of Sundarbans.

*Siphonaria* is a genus of marine pulmonate gastropod mollusc in the family Siphonariidae, the air-breathing sea snails or false limpets (Rosenberg and Gofas, 2012). Members of the Siphonariidae family are not true limpets. They are a distinct gastropod family exhibiting an evolutionarily

convergent where unrelated species exhibit similar form and function. The finding is the outcome of an investigation into the edible oyster reef of Kaikhali in Sundarbans region of West Bengal coast. *Crassostrea gryphoides* was present in both the sites but *Saccostrea cucullata* was found only in Frasergunj. Kaikhali (22°02'14"N, 88°61'55"E) is at the confluence of mighty rivers of Matla and Bidya, opposite to Jharkhali. It is located in the central sector of Indian Sundarbans. This area is noted for its wilderness and mangrove diversity. Frasergunj (21°57'94"N, 88°25'08"E) is a fishing harbor and located near Bakkhali. Frasergunj is situated at the confluence of the river Muriganga and the Bay of Bengal in the western sector of Indian Sundarbans. Various associated organisms are observed within oyster reef providing high biodiversity. *Siphonaria siphonaria* Sowerby, 1830

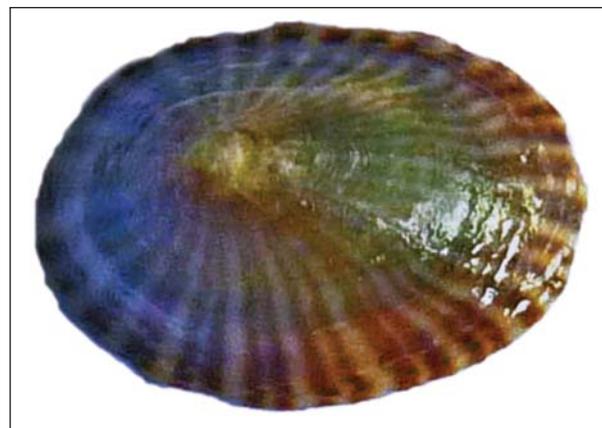


Fig. 1. Dorsal view of the *Siphonaria siphonaria* Sowerby, 1830

have been recorded from the Indian Sundarbans region along the several associated organisms of edible oyster. Although the genus of *Siphonaria* is common along the Indian shore but nothing is known regarding its distribution around the coast of West Bengal. This paper deals with the description of genus *Siphonaria* found from the West Bengal coast and it is the first record in West Bengal.

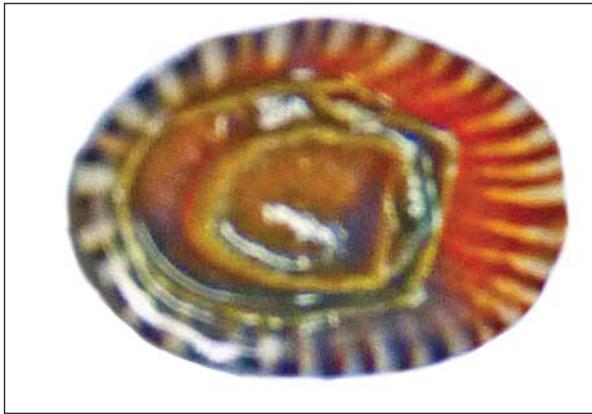


Fig. 2 Ventral view of the *Siphonaria sipho* Sowerby, 1830

### METHODOLOGY

A systematic monitoring practice undertaken for a period of three years during 2009–2012, revealed certain alarming facts. Samples of oyster were collected randomly during low tide along three prominent season, pre-monsoon, monsoon, post-monsoon from the two selected study sites namely Frasergunj and Kaikhali of Sundarbans region during the study period. The collection of the hosts was started in September, 2009 and continued up to August, 2012. Stainless steel hammer and rod were used to separate oysters from their surrounding cliffs. Both *Crassostrea gryphoides* and *Saccostrea cucullata* were collected from Frasergunj and *Crassostrea gryphoides* only collected from Kaikhali.

The *Siphonaria* were collected from the oyster reef along intertidal zone in the field as well as in the laboratory. The isolated organisms were then fixed in 10% buffered formalin for a minimum of forty eight hours prior to sorting and identification of organisms at the lowest

practical taxonomic level. Following identification, organisms were then preserved in 70% ethanol for further examination (Bondad-Reantaso *et al.*, 2001). Specimens have been documented and photographs of the organisms were taken with Panasonic DMC-FZ35 digital camera.

## RESULTS

### SYSTEMATIC POSITION

Kingdom ANIMALIA  
 Phylum MOLLUSCA  
 Class GASTROPODA  
 Subclass HETEROBRANCHIA  
 Superfamily SIPHONARIOIDEA  
 Family SIPHONARIIDAE  
 Genus *Siphonaria* Sowerby, 1823

### DISTRIBUTION

The Siphonariidae (Gastropoda: Pulmonata) is a diverse family which includes about seventy five species occurring globally (Rehder, 1981). The majority of the genus including the *Siphonaria* is found in the Indo-Pacific region especially in the southern hemisphere (Hubendick, 1946). *Siphonaria* species reported from the rocky coasts of Karachi, Pakistan (Northern Arabian Sea) (Bano *et al.*, 2011). This genus *Siphonaria* occurs worldwide in most tropical and temperate seas with the exception of the northern Atlantic. Several species of *Siphonaria* are occurring along the shores of the India. The genus includes atleast fifteen species namely *Siphonaria acuta*, *Siphonaria aspera*, *Siphonaria basseinensis*, *Siphonaria funiculata*, *Siphonaria kurracheensis*, *Siphonaria laciniosa*, *Siphonaria plana*, *Siphonaria savignyi*, *Siphonaria sipho*, *Siphonaria sipho* var. *exigua*, *Siphonaria Siphonaria basseinensis*, *Siphonaria Siphonaria kurracheensis*, *Siphonaria siquijorensis*, *Siphonaria zebra* and *Siphonina reticulata* (Bio search, 2012). Rao (1991) reported *Siphonaria sipho* Sowerby, 1830 from the rocky sea shores of Andaman and Nicobar Islands. The

animals clamped by means of their strong foot with other sedentary, air-breathing animals which are common on intertidal rocks. In the present investigation *Siphonaria siphon* Sowerby, 1830 (Sea Snail) had been observed from the upper surface of the shell of edible oyster, *Crassostrea gryphoides* at Kaikhali in Sundarbans region of West Bengal coast.

### DIAGNOSIS

*Siphonaria* is a genus of gastropod molluscs, one of the three genera in the family Siphonariidae. Siphonariids resemble true limpets (family Acmaeidae), but do not have true gills. Instead, siphonariids have either secondary gills in the mantle cavity or the mantle cavity serves as both a lung and a generalized gill. Siphonariids live on rocks close to the high tide line, where they can remain wet. Siphonariid eggs are laid in jellylike strings near the water's edge. Upon hatching, the young pass through a brief free-swimming stage before settling on rocks near the high tide line (Rehder, 1981). Outline of the shell, in dorsal view, not symmetrical, the apex slightly to the right of the midline; muscle scar often indistinct. Shell morphology well suited for life on wave-swept rocky intertidal shorelines.

The genus *Siphonaria*, erected by Sowerby in 1823, is one of the most naturally occurring molluscs. Shell normally almost circular, depressed conical and usually solid, porcellanous and thin. The apex is sub-central, smooth in the youngest specimens but in older specimen it is somewhat eroded. The upper surface marked with from twenty five to forty five elevated radiating ribs or ridges, which are reticulated by the coarse, somewhat elevated lines of growth. The interior is usually polished, except on the muscular impressions, which are granulous and strongly impressed. There is a scar interior of the shell indicating an attachment of the mantle to the shell. The pulmonary cavity of *Siphonaria* opens through a siphon located on the right side, often marked externally by a lateral siphonal expansion

and internally by a gap in the right arm of the horseshoe-shaped muscle scar.

The species of *Siphonaria* (Fig. 1 and Fig. 2) were identified on the basis of shell color and structure, and were found to comprise the species, *Siphonaria siphon* Sowerby, 1830 (Sea Snail), (WoRMS, 2012). In the present study the specimen measures 9-10mm in length, 6.5-8 mm in width and 4-5.5 mm in height. The specimen has been deposited in the Mollusc section of Zoological Survey of India, Kolkata (Registration number M27269/5).

### REMARKS

*Siphonaria siphon* co-occurs with other rocky intertidal species such as oyster in the intertidal zone of Sundarbans. With the combination of a gill and a pulmonary cavity enables *Siphonaria siphon* to respire both in and out of water.

### SUMMARY

The genus *Siphonaria* belongs to the Kingdom Animalia, Phylum Mollusca, Class Gastropoda, Subclass Heterobranchia, Superfamily Siphonarioidea, Family Siphonariidae. They are often called false limpets to distinguish them from the Patellogastropoda or true limpets which are one of the most basal branches of the gastropod tree. The distribution and diversity of molluscan fauna around the West Bengal coast had been well studied by Subba Rao *et al.* (1992) and various workers but no report on *Siphonaria* has been recorded till now. The study provides for the first time, the basic knowledge about the presence of the marine mollusc of genus *Siphonaria* from West Bengal coast.

In the present study *Siphonaria siphon* was found as associated organisms of edible oysters which create a complex matrix of structured habitat, not unlike coral reefs, important to many fish and invertebrate species, which enhance estuarine biodiversity (Wells, 1961; Breitburg, 1992). The loss of oysters and the associated

structured habitat has cascading negative consequences on the biodiversity of the estuarine ecosystem. Regardless of composition, structure or size, the creation of oyster reefs results in the placement of new, uncolonized habitat into the natural environment (Osman and Whitlatch, 1999). Increasing urbanization raises many concerns about sustainability of biodiversity in terrestrial (Laurie, 1979; Breuste et al., 1998; McIntyre, 2000) and marine (Suchanek, 1994; Smith *et al.*, 2000) habitats. Though the economic impacts of *Siphonaria siphon* Sowerby, 1830 has been deemed

negligible in the Indian Sundarbans region of the West Bengal coast but studies on its distribution, biology and population trends are to be needed.

#### ACKNOWLEDGMENTS

One of the authors (TB) is thankful to University of Kalyani for financial support in the form of a research scholarship to carry out the research work. Sincere thanks are also due to Dr. Chandrakanta Mandal, Mr. Amit Mukherjee and Mr. Santanu Mitra of Zoological Survey of India, Kolkata for their active help, cooperation and suggestions.

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