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New record of a primitive brachiopod benthic fauna from the North- East coast of India

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A B S T R A C T

The intertidal belt at the confluence of Subarnarekha estuary, a transboundary with Bay of Bengal is an example of physically stressed heterogeneous habitats possessing a number of mudflats and sand flats that support the lives of an assemblage of diversified macrobenthic fauna. The Brachiopods (Lampshells) make up a major macrobenthic faunal group in this area which includes several morphotypes of *Lingula anatina* distributed in some restricted areas of the world. The morpho-anatomic study of *Lingula anatina*- a Precambrian living fossil as a new record from the eastern part of West Bengal has been undertaken in the present study.

Introduction

The intertidal belt of Midnapore coast, especially the studied area supports diversified forms of macrobenthic fauna which include good number of brachiopodans which has not been reported earlier from West Bengal coast-Talsari mudflats. Brachiopods (from Latin-brachium; poda-foot) make up one of the important minor animal phyla, also known as lamp shells are sessile benthos and two

shelled marine animal. About 30000 species and 120 genera under the phylum of brachiopoda have been described in a fossil record which extends into the lower Cambrian period of which 300 or so species of brachiopods remain. (Pennington, J.T. et al., 1999; Stricker, S.A., 1999 and Emig et al., 2013). Most living brachiopods are articulate, there being only about 50 species of inarticulate

(Rupert, Fox, Barnes, 2004). The inarticulate brachiopod of family Lingulidae has only two living genera- *Glottida* and *Lingula* (Emig and Bitner, 2005). This rare group of benthic animal is reported from some river mouth of Indian coasts (Godavari, Krishna, Ganges and Gujrat coast) (Rao, 2004). But *Lingula anatina* is being reported from the confluence of Subarnarekha estuary near New Digha.

Materials and Methods

Lingula anatina was studied over a stretch of 3 km along the Talsari (21°36' N and 87°27' E) during July 2010 to Jun 2011 employing 0.5 m² quadrant from the lowest low tide level to the highest high tide mark of the intertidal belt at three different study sites, located at an interval of 1 km distance. Specimens after being collected were preserved in 4% formalin solution with glacial acetic acid for the further studies at laboratory. The species was identified with the technical assistance and standard literatures of Dr. Christian C. Emig, Directeur de Recherches Honoraire- C. N. R. S., 20, Rue Chaix, 13007 Marseille, France.

Result and Discussion

Lophophorates, a unique group of aquatic invertebrates, characterized in having a flap of muscle endowed spiral feeding structure of ciliated tentacles around the mouth known as lophophore. Traditionally this group includes the brachiopod or lamp shell, the bryozoans or moss animals and the phoronids. Among these *Lingula anatina* (Inarticulate brachiopoda) is being reported presently from the confluence of Subarnarekha estuary (Talsari 21°36' N & 87°27' E) near New Digha, West Bengal, India. Brachiopods (from Latin: brachium-

arm; poda-foot), are sessile benthos, and inhabit mostly in tidal mud-flats, containing hard calcareous shell covering the anterior part. The inarticulate brachiopod belonging to the family Lingulidae has only two living genera- *Glottida* and *Lingula* (Emig and Bitner, 2005).

The first descriptions of *Lingula* were made from then extant specimens by three famous French scientists: Bruguière, Cuvier, and Lamarck. In 1812 the first fossil lingulids were discovered in the Mesozoic and Palaeozoic strata of the U.K. and were referred to *Lingula* on the basis of similarity in the form of the shell. In the 1840's other linguliform brachiopods from the Palaeozoic were described. Darwin in 1859 described *Lingula* as "living fossil" in his book "On the Origin of Species (Emig, 2008). Although they were extremely common throughout the palaeozoic, today they are considered a minor phylum, and only five orders have extant representatives. Among these Lingulida comprises two families, 6 genera and 25 species (Emig, 2013).

Observation suggests that the *Lingula anatina* (Fig: 1) shell composed of two separate bilaterally symmetrical, little dissimilar valves. Anterior margin of which are marked with bristles. Lower side of the valves is enriched with signs of muscle scars and canals. The valves are collagenous chitinophosphatic in composition (Williams et al., 1994). The anterior body wall extended forming mantle. As an elevation of ventral mantle lobe a long extension is formed from the posterior end of ventral valve called pedicle. Mainly three different types of muscles (viz. - one pair of anterior adductor muscle, one pair of posterior adductor muscle and three oblique muscles). Besides one pair of lateral muscle have also

been found in *Lingula anatina*. The outgrowth of the anterior body wall forms lophophore which acts as filtering device during feeding in these animals. The digestive system originates from mouth which is a transversely elongated slit found

in the centre of the lophophoral base between the brachial fold and tentacular fringe and terminates after convolutions of intestine at the right side into the mantle cavity. There are two conspicuous digestive

Figure.1 *Lingula anatina*, pre-cambrian inarticulate brachiopoda.



glands with four ducts surrounding the stomach and pale yellowish in colour. The coagulable pinkish coelomic fluid contains spherical, amoeboid phagocytic coelomocytes and spicules. A pair of nephridium with nephrostome and nephridiopore situating beneath the digestive gland on both side of intestine. *Lingula anatina* is dioecious animal (Emig, 1997) and male have pale white testis and female contain deep yellowish red ovary.

The individual of these species collected from three different study sites possesses common morphoanatomic features. Specimens occur in abundance in tidal creek. Field observations strengthen the fact that tidal waves and water current forced to uproot these infaunal animals causing reformation of their habitats every year during monsoon and post monsoon

period. As a result new colony represents a mixed colony containing young, middle aged and aged individuals of *Lingula anatina*

Historically, the group has been well studied by paleontologists but neglected by biologists. The present paper has attempted to investigate on the morphology and anatomy of *Lingula anatina*, brachiopodan species having unique morpho-anatomic excellence, excellence, documented presently from midnapore (East), West Bengal- Orissa coast, India.

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References

Emig, C. C., Ecology of inarticulate brachiopods, In: R. L. Kaesler (ed.), Emig C.C., On the history of the names *Lingula anatina* and on the confusion of the forms assigned them among the Brachiopoda.- Carnets de Géologie / Notebooks on Geology, Brest, 2008, Article 2008/08 (CG2008_A08).

Emig, C. C., Bitner, M. A. and Alvarez, F., Phylum Brachiopoda. Zootaxa, 2013, 3703 (1): 75-78.

William, A., Cusack, M. and Mackay, S., Collagenous chitinophosphatic shell of the Brachiopod *Lingula*. Phill. Trans. Roy. Soc. Lond. B. BiolSci, 1994, 346: 223-266.

Rao Nagaeswara, C.A., Faunal Diversity: Estuarine Ecosystem. Freshwater biological Station, Zoological Survey of India, 1-1-300/B, Ashoknagar, Hyderabad-500020. EPTRI-ENVIS Newsletter, 2004, Vol.10, No 3, pp-9.

Rupert, E.E., Fox, R.S. and Barnes, R.D., Invertebrate zoology: A Functional Evolutionary Approach. 7th ed., 2004, Thomson, Brooks/Cole vii-xvii, 1-963, 11-126.

Treatise on Invertebrate Paleontology. Part H, Brachiopoda revised, Geological society of America, Boulder and University of Kansas Press, Lawrence., 1997, 1, 471-495.

Emig, C and Bitner, A M., The Brachiopod *Lingula* in the middle Miocene of the Central Paratethys, Acta Palaeontologica Polonica, 2005, 50(1):181-184.