CHAPTER 2

REVIEW OF LITERATURE

Investigations on benthic community have a long history. A literature review was undertaken as an evaluation step for various aspects of benthic research. This review pinpoints an account of past and present benthic research activity from existing scientific informations. Written records of significant biological observations concerning marine organisms began with the early Greek philosophers, most notably Aristotle. Until the renaissance period, very few studies were carried out, since it was the prevailing view that Aristotle had already discovered and described everything. Renewed interest in natural history began to increase by the 16th century and over the next few hundred years, many studies carried out by amateur naturalists. Investigations with respect to benthos advanced well only in the late 18th and early 19th centuries when the use of various dredging devices became popular.

A new era in the benthic study was started during early 1900’s. It was connected with the detailed investigations of Petersen (1913, 1915 and 1918) and Petersen and Jensen (1911) along Danish waters. Their works mainly focused on community structure and standing crop of benthic animals. This initiated a number of other investigations on benthic fauna in different parts of the world. But most of these studies were restricted to macrobenthos owing to the relative ease in investigation. The works of Remane (1933), Mare (1942) and Weiser (1953 and 1960) on meiobenthos have been considered as pioneer investigations in the field of meiobenthology. The earlier researchers at some stage struggled to convince the public or those in power, of the values of ecosystems that remain hidden from view.


In recent times there has been a steady shift in the study of benthic communities from the base line to applied aspects. Considering the vast body of literature available in recent times, only the monumental works has been reviewed.
here. Published results are available on benthic responses to contamination (Mu et al., 2002; Paolomagni, 2003). Britta Gribsholt and Erik Kristensen (2003) examined benthic metabolism and sulfur cycling. Thomson (1983), Rees and Walker (1983, 1984, & 1988), Norton et al. (1984), Carr et al. (2000), Schratzberger (2003), Borja et al. (2000 and 2004), Mathew et al. (2005), Robert et al. (2005) and Martin et al. (2006) well documented the impact of pollution and pollution monitoring using benthic invertebrates. Melanie (2004) examined the effect of boat generated waves on benthos along Sidney coast. Christian et al. (2005) examined the biogeographic provinces of polychaetes along Chile coast. These works are worthy and would be of immense use to the benthic ecologists. Resurvey of historical sampling location to study the long term change in community structure is recently giving curiosity to a handful of scientists. The investigations of Bruce et al. (1977), Bradshaw et al. (2002), Edgar et al. (2004) are worth mentioning. Reports are accessible on evolutionary aspects also; Sorakang et al. (2000), Richard et al. (2001), Angelika et al. (2004), David et al. (2005) are of special concern. Currently there is an upsurge of investigations to map the bottom morphology and biocoenoses using advanced techniques. Florian et al. (2003) studied the spatial variability of benthic communities by axial tomodensitometry. Matarrese et al. (2004) mapped the bottom community using side scan sonar and under water video camera.


Though extensive literature is available on the benthos of temperate zones, information along Indian waters is insufficient. Our knowledge of benthic realm lacks
behind that of terrestrial environment. Among the limited studies, preponderance of work concentrated on shallow coastal waters, intertidal zones and mangrove ecosystems, giving limited attention to estuarine bottom fauna. Investigations of Annandale (1907) in brackish water ponds of Port Canning and Bengal turned over a new leaf in the history of Indian benthic explorations. Annandale and Kemp (1915) examined the ecology of benthic fauna of Chilka Lake. Pannikar and Aiyar (1937) studied the brackish water fauna of Madras. Although studies on bottom living animals have been made on early epoch of 20th century, the qualitative and quantitative work using suitable sampling equipments is comparatively recent.


Reddy and Reddy (1994) gave a comprehensive picture of foraminiferal assemblage in Araniar estuary. Distribution of benthic Ostracoda in Adyar estuary was investigated by Hussain and Mohan (2001).

Regarding Vellar estuary, Balasubrahmanyan (1964) and Ajmalkhan et al. (1975) are the pioneer researchers in this field. Distribution and seasonal variation of macrobenthos was investigated by Chandran et al. (1982). Fernando et al. (1984), Chandran (1987) and Srikrishnadas et al. (1987) focused on qualitative and quantitative survey of macrofauna.

When we consider Coleroon estuary, Prabha Devi (1986) and Prabhadevi and Ayyakkannu (1989) surveyed macrobenthos of the Buckingham Canal.
Chapter 2

Review of Literature

backwaters of Coleroon Estuary. Later Raveenthiranaath Nehru (1990), Jegadeesan and Ayyakkannu (1992) and Paterson Eward and Ayyakkannu (1992) carried out extensive survey of benthos of this region.

Coming to west coast of India, Kurian (1953) conducted detailed investigations along Travancore coast. Desai and Kutty (1967) conducted a preliminary survey of meiofauna and macrofauna of near shore region of the Cochin. Later Kurian (1967 and 1971) carried out extensive investigations on bottom fauna along southwest coast of India. Damodaran (1972) investigated the meiobenthos of mudbank of Kerala coast. Seshappa (1953) gave an account of bottom fauna of Malabar Coast. Joydas (2002) analyzed the faunal composition of macrobenthos from the shelf regions off the west coast of India. Raghunathan et al. (2003) surveyed the impact of turbidity on macrobenthos along selected regions of west coast. Joice and Madhusudana Kurup (2006) investigated the impact of bottom trawling on benthos along the inshore waters off Kerala. Sajan and Damodaran (2007) analyzed the faunal composition of meiobenthos from the shelf regions off the west coast of India. Nanajkar and Ingole (2007) studied the potential of using nematode as indicator organism along central west coast of India. The regulation of sediment granulometry on the community composition of macrobenthos along the continental shelf of south west coast of India was documented by Jayaraj et al. (2007).

A number of investigations have been carried out in the estuaries of west coast also. In Kayamkulam estuary effect of hydrogen sulphide on benthic fauna was documented by Gopakumar and Kuttyamma (1999). Nair et al. (1984) studied the ecology and distribution of benthic macrofauna in the Ashtamudi estuary. Abdul Azis and Nair (1983) surveyed the meiofauna of the Edava-Nadayara Paravur backwater system and highlighted the effect of coconut retting on meiofauna.

Coming to Vembanad Lake, Devassy and Gopinathan (1970) gave a brief account of the macrofauna and meiofauna, and discussed their relationship with
Chapter 2

Review of Literature


Parulekar's investigations in Mandovi-Zuari canal system are milestones in the history of benthic exploration. Parulekar et al. 1973, 1975, 1980 and 1986 and Parulekar and Dwivedi (1975) paid attention on macrofaunal distribution, production, trophic relations and regularities of faunal distribution. He highlighted the need to conserve the fragile ecosystem. Ansari et al. (1982 and 1994) examined the feeding

Varshney et al. (1984) examined meiobenthos of polluted and unpolluted environments of Versova, Bombay. Estimation of biological characteristics of the Vashishti Estuary, Maharashtra was carried out by Nair et al. (1998). Govindan et al. (1983) gave useful information on benthic studies along Gujarat estuaries.

The pursuit of literature make it abundantly clear that enumeration, identification and correlation with some physicochemical factors have historically been the forte of Indian researchers and even these efforts did not make much headway. In other countries, studies advanced by leaps and bounce to an enviable level of achievement. We have also an intervening period of inaction. The present study is an endeavor to bridge this gap.