

Associated Fauna of Seaweeds and Seagrasses in Vellar Estuary

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Abstract: In the present investigation, the percentage of faunal composition of *Chaetomorpha linum* ranged between 1.41 and 36.63 %. The range of faunal composition was from 2.21 to 32.61 % in *Enteromorpha intestinalis* and 3.76 to 30.43 % in *Enteromorpha compressa*. In *Hypnea musciformis*, the faunal composition varied from 2.12 to 34.44 % and in *Padina gymnospora* it assorted from 2.82 to 24.29 %. Three different seagrasses were recorded during the present study, of which *Halodule pinifolia* showed large variety of faunal assemblages, the percentage of faunal composition ranged between 0.44 and 27.66 %. In *Halophila beccarii*, the faunal composition varied 3.43 to 25.64 % and in *Halophila ovalis*, the range was from 3.04 to 30.6 %.

Key words: Seaweeds % Seagrasses % Associated Fauna % Vellar Estuary

INTRODUCTION

Seaweeds zone and seagrass beds are the conspicuous and widespread biotopes in the shallow marine environment. The faunal associations with the plant communities have been receiving some attention from various parts of the world only in recent years. The fauna associated with seaweeds and seagrasses are mainly to fulfill their needs I) food and breeding habitats, II) protection of juveniles against tidal currents and waves, III) oxygen in water and IV) protection from predators Ansari [1]. Even though considerable attention has been paid to the study of seaweeds associated fauna in tropical waters, studies on faunal association with seagrasses along Indian coasts are meager.

Seaweed provides shelter to a variety of organisms and enhances the biodiversity. Many organisms restrict their movements to the vicinity of shelter. In the marine environment, shelter provided by submerged structures of relative complexity. Submerged vegetation can influence the distribution of marine fish [2]. In spite of this, the influence of macroalgae on fish assemblages in the tropics has been poorly investigated. Although herbivory is widespread among fishes in the tropic at coast, macroalgae are of minor importance as a direct food resource for herbivorous fish. Macroalgae may nevertheless provide shelter as well as profitable foraging sites for invertebrate feeders and omnivores, which predate on the associated epifauna.

A great deal of information is available is available on the fauna associated with seaweeds and seagrass of temperate waters [3-18].

There are many scattered references to the associations of animals to marine algae from the Indian coasts. However, in depth studies on the nature of relationships, distribution and abundance of animal populations on seaweeds are lacking except for a few recent studies [19].

It has been observed that many species inhabiting marine algae depend on them as a source of food. The most common browsers are polychaetes, isopods and gastropods. Numerous recent investigations have shown that many polychaetes, isopods and decapods, are capable of digesting good plant origin.

MATERIALS AND METHODS

Seaweeds and seagrasses were collected from each station at random during low tide. The method of Sarma and Ganapathi [20] was followed. A wooden frame of 50 x 50cm was placed over the area covered by seaweeds and seagrasses and all the vegetation inside the frame was taken and transferred immediately into a polythene bag and the samples were brought to the laboratory. The algae and seagrasses were later kept in separate polythene basins containing filtered seawater. Then the samples were fixed in 10% formaldehyde solutions. Vigorous shaking in formalin solution dislodges most of

the clinging animals. Small portion of the sample was taken into a Petri dish and carefully examined for every frond under a binocular microscope with strong incident illumination. The animal groups were sorted, counted and preserved for specific determination. The quantitative data was expressed in terms of number of animals per unit weight of algae.

The present investigation was carried out in two different stations located in the Velar estuary.

RESULTS AND DISCUSSION

The examination of phytal fauna on the Vellar estuary, revealed the presence of a rich variety of nematodes, harpacticoids and amphipods. In addition, a number of polychaetes, ostracods and gastropods were also present. In the present investigation, the percentage of faunal composition of *Chaetomorpha linum* (Fig. 1) ranged between 1.41 and 36.63%. The range of faunal composition was from 2.21 to 32.61 % in

Enteromorpha intestinalis (Fig. 2) and 3.76 to 30.43 % in *Enteromorpha compressa* (Fig. 3). In *Hypnea musciformis* (Fig. 4), the faunal composition ranged from 2.12 to 34.44 % and in *Padina gymnosphora* (Fig. 5) it ranged from 2.82 to 24.29 %.

A great deal of information is available on the fauna associated with seaweeds of temperate waters Wieser [3, 6], Chapman [4], Southward [5], Sloane *et al.* [7], Fuse [8], Mc Lean [9] Ledoyer [10-12], Ohm [18], Glynn [14], Hagerman [15], Moore [16], Alcalá *et al.* [17] Makkaveeva [18]. Whereas in India, information become scarce Sarma and Ganapathi [20, 21], Sarma [19], Joseph [22, 24], Yogamoorthi [25] and Muralikrishna Murthy [26].

It is well known that the phytal faunal density is also dependent on the morphology of the algae (structure, texture, colour and contour) and its sediment retaining capacities Sarma and Ganapathi [21]. A close scrutiny of the data collected presently revealed the presence of rich and bewildering array of faunal groups in the filamentous alga *Chaetomorpha linum*. Though it is filamentous form, due to its densely growing habit providing more area of substratum, it supported a high number of organisms, compared to other seaweeds. The thin filamentous fronds of *Enteromorpha compressa* with poor sediment retention capacity may explain for poor faunal association, comparatively less than that of other algae. *Enteromorpha intestinalis* has less faunal assemblage comparatively due to its simple type of ramification and texture of the fronds. However, the red algae *Hypnea musciformis* due to its branched and bushy nature are found to support higher number of animals.

Padina gymnosphora has more number of faunal assemblages due to its fan shaped thalli. Warwick [27] suggested the faunal abundance among the algae related to the texture of the algae. Even though *Padina gymnosphora* has wide fan shaped fronds, there are possibilities of silt deposition. The compact rhizoidal holdfast with maximum sediment retention capacity can harbour large number of fauna and sediment dwelling groups. Besides these positive add-ups, the animals appear to have been washed away by wave action. Hence, wave action is also an important factor influencing the faunal assemblage and its abundance.

The fine sediment deposited on the algae with a thin film around is known to be an incentive for the heavy colonization of detritus feeding organisms like harpacticoid copepods and nematodes Wieser [3, 6], Hagerman [15], Sarma and Ganapathi [20]. In the present investigation also, a number of detritus feeding organisms were noticed.

Seagrasses have variety of faunal assemblage. Three different seagrasses were recorded during the present study. Of which, *Halodule pinifolia* (Fig. 8) showed large variety of faunal assemblage, the percentage of faunal composition ranged between 0.44 and 27.66%. In *Halophila beccarii* (Fig. 7), the faunal assemblage ranged from 3.43 to 25.64% and in *Halophila ovalis* (Fig. 6), the range was from 3.04 to 30.6 %. Seagrass fauna rarely associate to particular seagrass species but respond to a restricted set of physical environmental parameters. Consequently many animal species are common to adjacent beds of different seagrass species. In the present investigations also, diverse variety of species were noticed in different seagrass species.

Many animals are permanent or temporary residents of seagrass meadows. Major factors that attract fauna for the protection that the seagrass canopy offers from predation and the presence of food. The seagrass system can have considerable economical value as nursery habitats for commercially important animal species. The wealth of the literature of fauna in seagrass system indicates that the faunal assemblages of seagrass meadows are not specific, but largely comprise species occurring outside the seagrass meadows as well. In the present investigation, *Halodule pinifolia* showed a variety of faunal assemblages. The density was also high due to it is lengthy leaves forming a dense mat. Hale [28] suggested that a number of species are morphologically adapted for life amongst seagrass leaves of a particular shape where their elongate body shapes

Percentage of Faunal composition

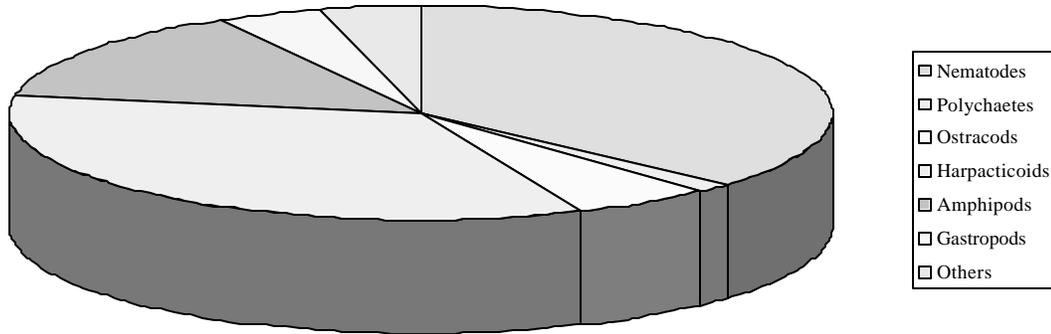


Fig. 1: Percentage of faunal composition in *Chaetomorpha linum*

Percentage of Faunal Composition

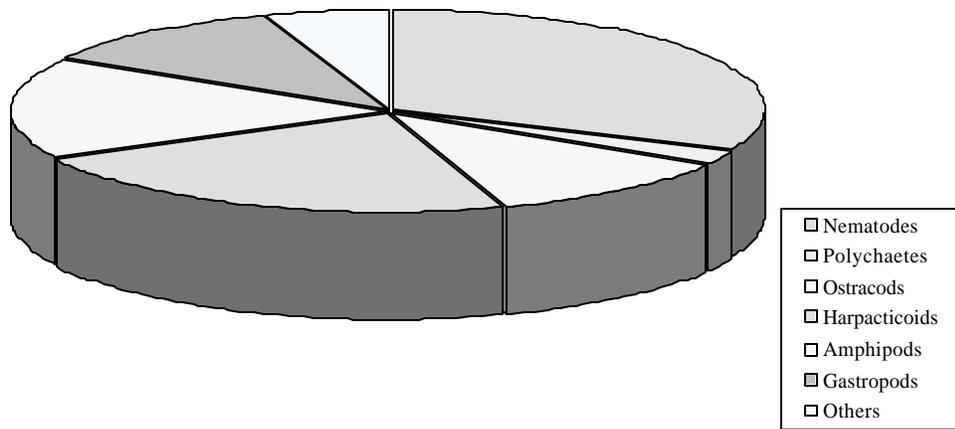


Fig. 2: Percentage of faunal composition in *Enteromorpha intestinalis*

Percentage of Faunal composition

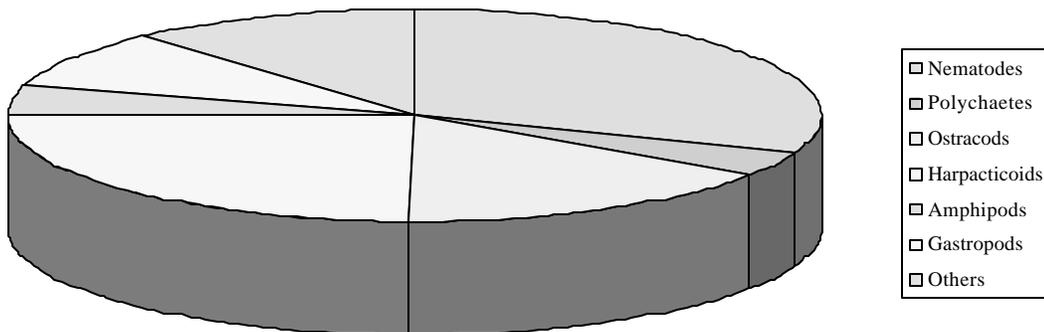


Fig.3: Percentage of faunal composition in *Enteromorpha compressa*

Percentage of Faunal composition

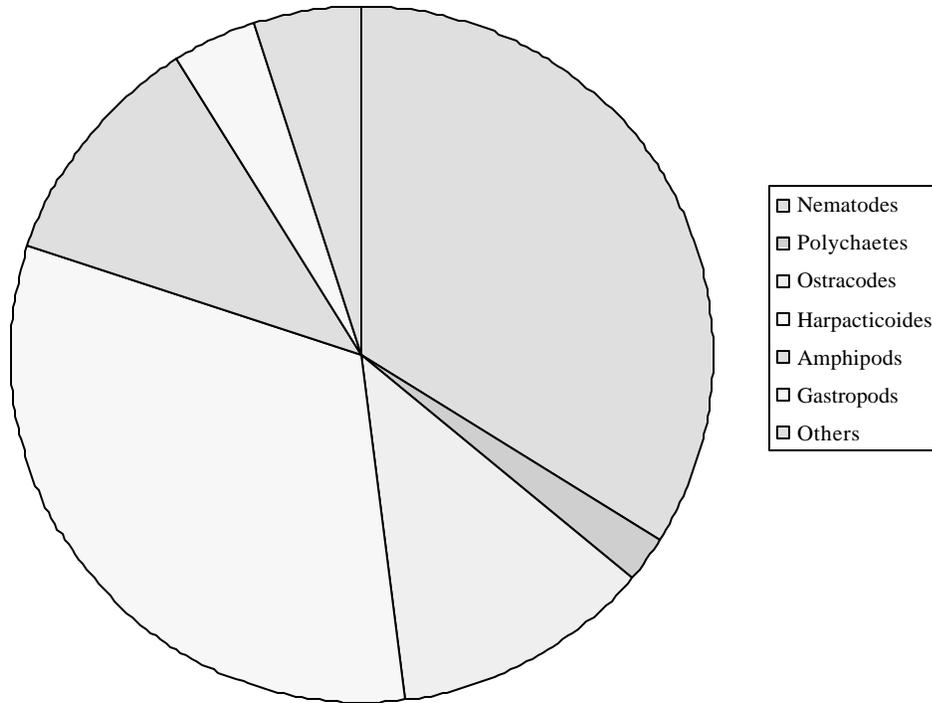


Fig. 4: Percentage of faunal composition in *Hypnea musciformis*

Percentage of Faunal composition

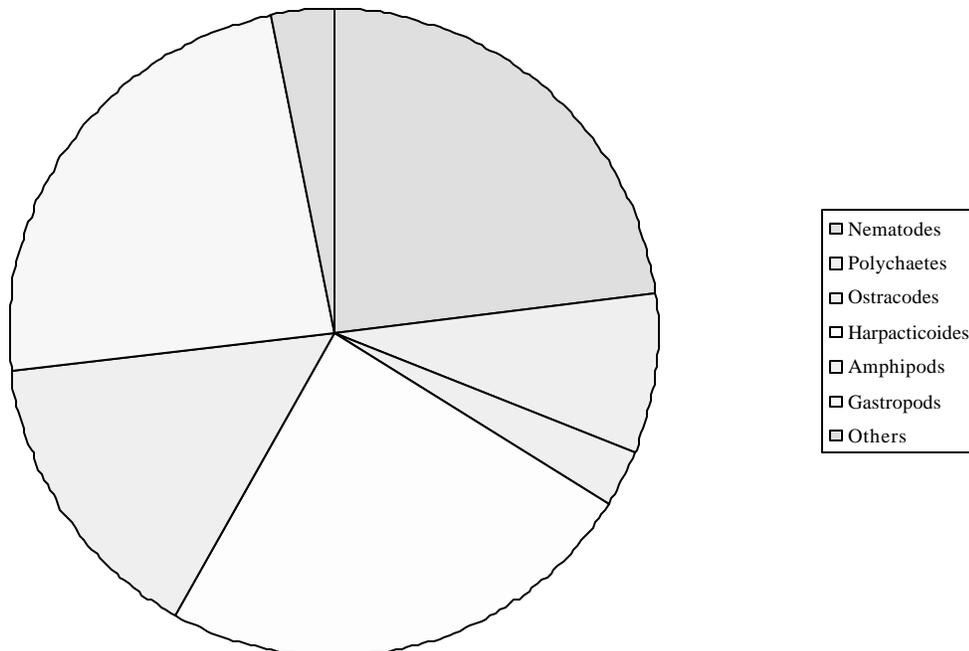


Fig. 5: Percentage of faunal composition in *Padina gymnosphora*

Percentage of Faunal composition

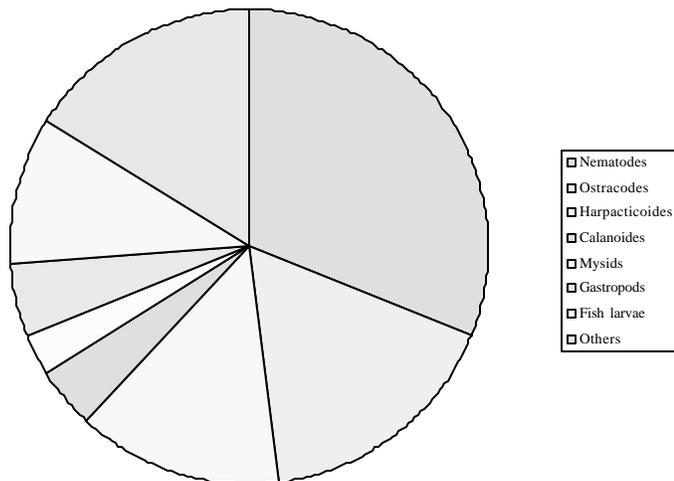


Fig. 6: Percentage of faunal composition in *Halophila ovalis*

Percentage of Faunal composition

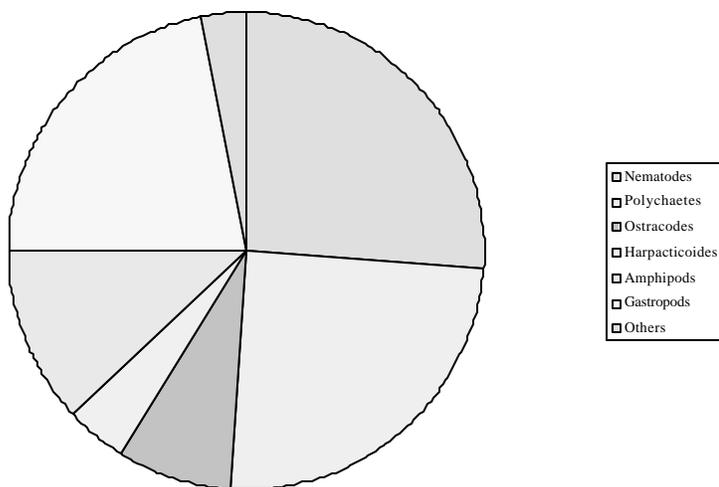


Fig. 7: Percentage of faunal composition in *Halophila beccarii*

Percentage of Faunal composition

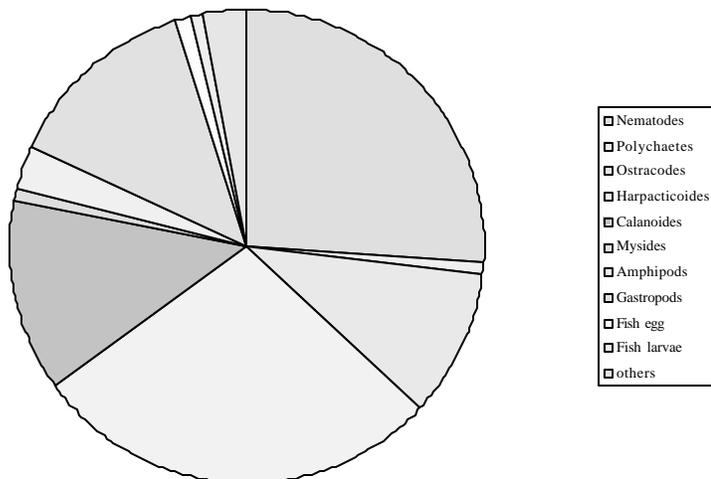


Fig. 8: Percentage of faunal composition in *Halodule pinifolia*

and green-brown patterns ensure highly effective crypsis. During the present study, Crab instars, shrimps and fishes were also recorded.

Though the present observation is on general agreement with the earlier observation made by Pollard [29] Klumpp *et al.* [30], Orth *et al.* [2], Brewer *et al.* [31], Haywood *et al.* [32] and Loneragan *et al.* [33]. The percentage of faunal composition was fairly high in seagrass meadows, which provide a hydrodynamic barrier to water movement, causing reduced erosion and deposition of fine detritus particles Eckman [34], Nowell and Jumars [35]. In many other studies, Young and Wadley [36], Poore [37], Walsh and Mitchell [38] seagrass faunal assemblages were found to change rapidly along environmental gradients. However, a large number of environmental factors including temperature, salinity, turbidity, oxygen concentration, pollution, water movement and level of nutrients also influence animal distributions.

Many species inhabiting marine algae depend on them for food. The most common browsers are polychaetes, amphipods and gastropods. The feeding relationships of the algal fauna also vary. Many are filter feeders, detritus feeders, scavengers or carnivores; algivores ranging from minute crustaceans to large sized gastropods. A few organisms are known to suck juice from the algae Hagerman [15], Mann [39], Nicotri [40]. Besides food, there are many other relationships between the fauna and seaweeds.

Thus the seagrass have been said to provide shallow marine areas with a "valuable benthic substratum" Howard *et al.* [41]. The biotic components of the algal faunal communities consist of an endemic assemblage of organisms, which vary with the phases of tides, the time of the day and the season of the year [19].

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