

A Note on the Distribution of Marine Macroalgae at Pulau Salu

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ABSTRACT

A quantitative study of marine macroalgae along two one-metre belt transects perpendicular to the shore, one situated across the northern reef and the other across the southern reef of Pulau Salu, Singapore, revealed 5 species of Chlorophytes and 3 of Phaeophytes. The seagrass, *Enhalus acoroides* was included in the study. Only the 2 most dominant brown algae, *Padina tenuis* and *Sargassum* sp. were common to both transects. In terms of distribution, all were confined to the reef flat and did not extend beyond the lower limit of the reef edge.

INTRODUCTION

This study was conducted as part of a project investigating the ecology of the coral reef at Pulau Salu. Ecological studies on marine algae have been undertaken in various parts of Singapore (Purchon & Enoch, 1954; Lee, 1966; Johnson, 1978; Teo & Wee, 1983). However, actual quantitative data on the distribution of marine macroalgae on a Singapore reef extending from the shore-line right down to the bottom of the reef slope have yet to be obtained. Such data are presented in this note. In this study, the seagrass *Enhalus*, although not an algae, is included.

MATERIALS AND METHOD

Two belt transects perpendicular to the shore-line were established, one on the south of Pulau Salu (Transect A) and the other on the north (Transect B). The reef profiles and determination of the tidal levels were carried out as described by Teo (1982). Each transect consisted of a line extending from the shore-line to the bottom of the reef slope. A one-metre quadrat (divided into 100 squares of 100 sq. cm each) was placed along one side of the line. The area covered by each species of algae was determined by counting the number of squares occupied by them. The quadrat was moved one metre at a time along the line. Snorkelling and scuba-diving were employed. Samples of algae were brought back to the laboratory for identification. The study was conducted between October and December 1982.

RESULTS AND DISCUSSION

A total of 8 species of macroalgae (5 belonging to Chlorophyta and 3 to Phaeophyta) were encountered along the 2 transects. The chlorophytes or green algae included *Caulerpa sertularoides* (Gmelin), *Codium geppii* Schmidt, *Enteromorpha clathrata* (Roth), *Halimeda opunta* (Linn.) and *Ulva reticulata* (Forss.).

The phaeophytes or brown algae were *Padina tenuis* Bory, *Turbinaria ornata* (Turner) and *Sargassum* sp. The *Sargassum* found on the reef were not identified to species and it is possible that more than one species were present.

The distribution of the algae including the sea grass *Enhalus acoroides* Rich. & Steud. along Transect A is

shown in Figure 1 while that of Transect B is shown in Figure 2. Only 2 species of algae, both brown, *Padina tenuis* and *Sargassum* sp., were common to both transects. The others were specific to a particular transect. In terms of abundance, 4 species occurred in very small numbers and were restricted in distribution on the reef flat. These were *C. sertularoides*, *H. opunta*, *C. geppii* and *E. acoroides*. On Transect B, *T. ornata* and *U. reticulata* were slightly more abundant but limited in distribution.

The most dominant on both transects was *Sargassum* whose distribution covered a wide area from the higher zone of the reef flat to the upper part of the reef slope. On Transect B, the frequency distribution of *Sargassum* increased towards the reef edge but on Transect A it was more or less similar throughout the flat with a marginal increase at the beginning of the reef edge. *Sargassum* cover has been noted by Chuang (1973) to be seasonal, with maximum cover during the cooler months (August to January) and minimum during the warmer months (February to July). This study was carried out during the cooler period and the distribution and frequency occurrence were high for this species.

The next most dominant species was *Padina tenuis*. It is distributed throughout the reef flat. At Transect A, it stops before the reef edge while at Transect B, it continues to the deeper limit of the reef edge. At Transect A, it appeared more prominent on the upper reef flat while at Transect B, it tended to build up on the lower reef flat. The green alga *E. clathrata* was the third dominant species on transect A and is found on the upper regions of the reef flat. The majority of the macroalgae occurred on sandy patches of the reef flat. Very few were found beyond the reef edge.

Benthic marine algae make major contributions to primary productivity, nitrogen fixation, community structure, organism distribution, carbonate production and reef consolidation and destruction. Setchell (1928) was probably the first to recognise fully the variety and importance of these roles of algae in coral reefs. He described zonation of algae across the reef. Dahl (1973) also demonstrated that certain benthic algae are useful as ecological indicators and can be used to provide a continuous record of environmental conditions.

It is hoped that the baseline information provided

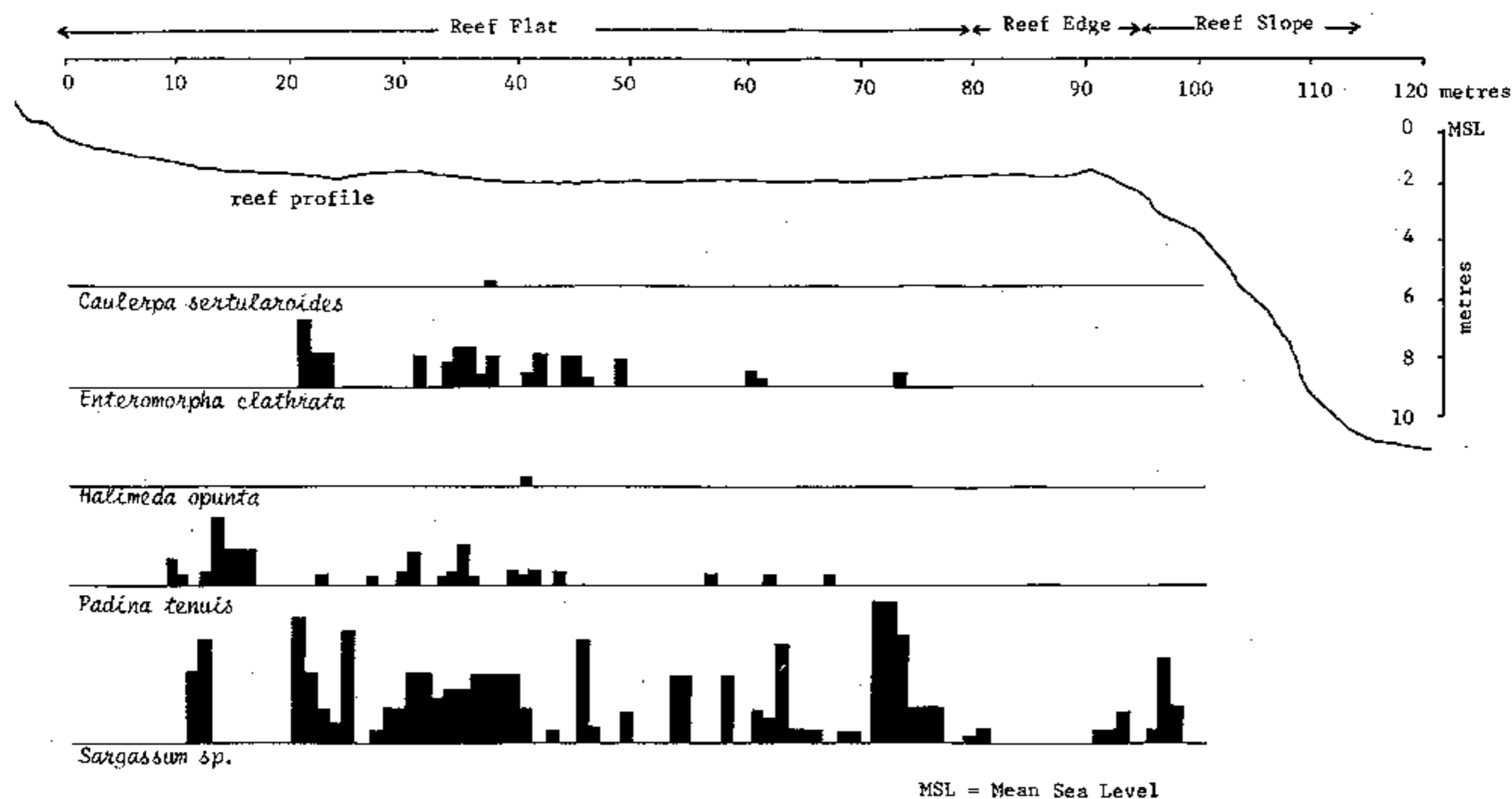


Fig. 1. Distribution of algae along Transect A at Pulau Salu reef (■ = 1000 sq. cm).

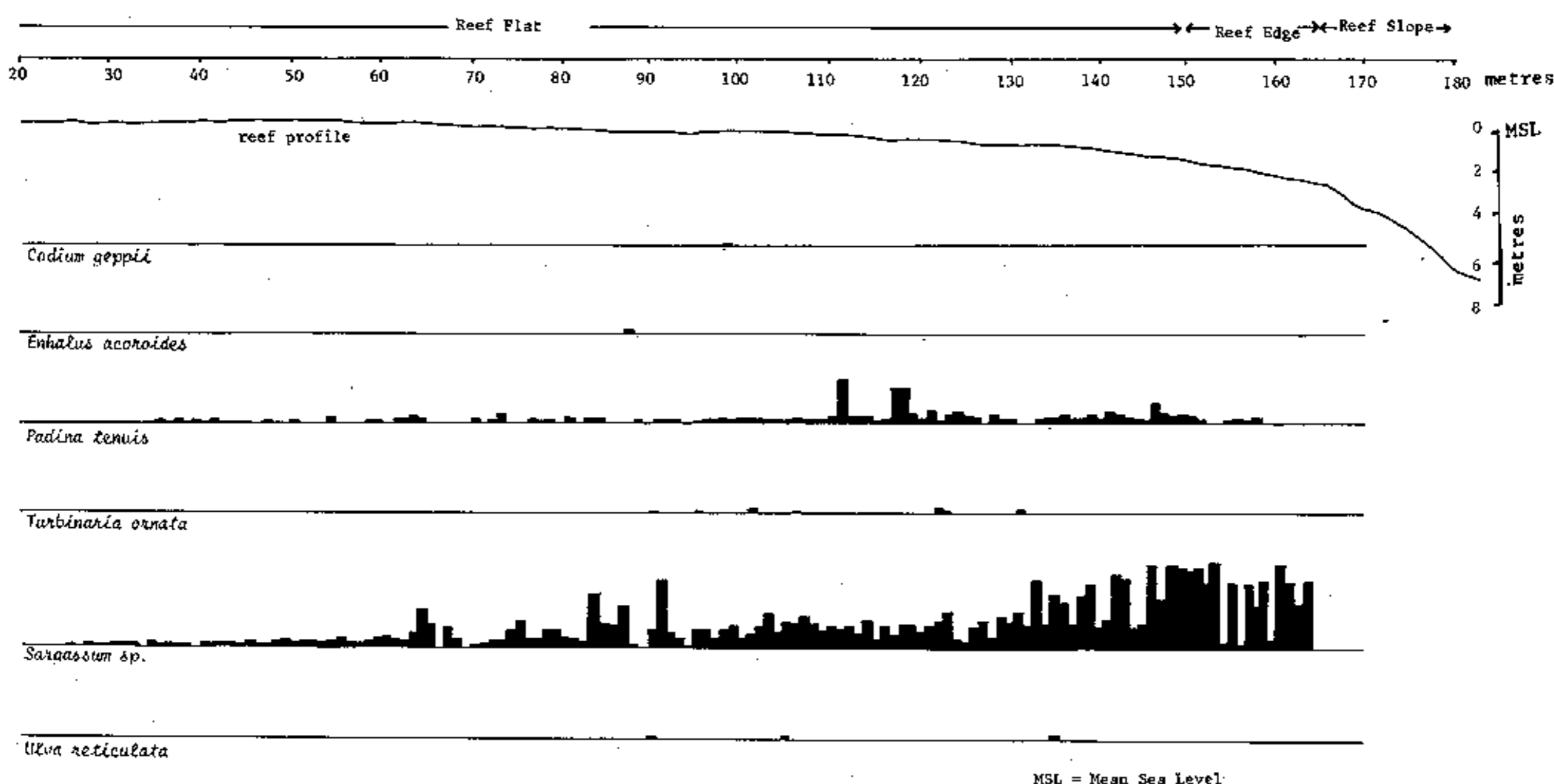


Fig. 2. Distribution of algae along Transect B at Pulau Salu reef (■ = 1000 sq. cm).

here can be used as a means of comparison with the distribution of algal species in the future to assess the effects of possible environmental change.

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