CHAPTER 5

CONCLUSIONS

Short-term laboratory experiments obviously showed the initial stage of interactions among different species of Montipora, namely, M. foliosa, M. ehrenbergii, M. digitata and M. foveolata. Extrusions of mesenterial filaments were found to be a major mechanism of aggression among xenogeneic pairs. The extrusion of mesenterial filaments were irregular and did not depend on light intensity or temperature. Bidirectional extrusion of mesenterial filaments were also found in the pairs of M. foliosa - M. foveolata. At the initial stage of xenogeneic interactions in short-term laboratory experiments, a linear ranked hierarchy was observed : M. ehrenbergii > M. foveolata > M. foliosa > M. digitata. However, this relation changed later on. During the long-term experimental period, the ranking was reversed only in the pairs of M. foliosa and M. foveolata. M. foveolata damaged M. foliosa in the first month but M. foliosa overgrew M. foveolata after the first month in many cases. Ranking of competitive ability among the four species of Montipora observed at the end of long-term experiments (14 or 18 weeks) was consistent with that observed in the field observations: M. ehrenbergii > M. foliosa > M. foveolata > M. digitata.

In intra-reef allografts, fusion occurred at a rate of 15.4%, 13.5% and 13.5% for M. foliosa, M. ehrenbergii and M. digitata respectively. It was obviously indicated that all the three species

of Montipora exhibited low rate of fusion. For Inter-reef allografts and across-island allografts, no fusing pairs were observed at all. It is hypothesized that M. foliosa and M. digitata can reproduce asexually by fragmentation while M. ehrenbergii can form new colonies by the processes of partial death of colony. The histoincompatibility response noted in M. foliosa, M. ehrenbergii and M. digitata are consistent with that of Montipora verrucosa, Porites lutea, P. eridani and Montastrea annularis studied by the other authors (Johnston et al, 1981; Jokiel et al, 1983; Nakaya, 1984; Logan, 1985). In Montipora foliosa, two different color morphs are clearly recognized, brown colony and purple edged colony, fusions were not seen in all inter-morph grafting pairs. The aggressive ability of the two morphs of M. foliosa did not show any difference remarkably. The fragment size and the region of colony in contact in allograft experiments did not play any roles in interactions. In both short-term and long-term grafting experiments, the extrusion of mesenterial filaments of the allogeneic pairs of the three species of Montipora were not observable. Most allogeneic interactions observed in natural reefs were overgrowth filling, fusion and indifference, respectively. All Isografts which were conducted in both field and laboratory experiments showed complete fusion of tissue and skeleton.

Several types of interactions were observed in the grafting experiments and field observations; overgrowth without damage, overgrowth with damage, unidirectional and bidirectional damage, filling, indifference and fusion. During the experimental period, many grafting pairs changed the type of interactions and some colony pairs showed different types of interactions in replicates. In general, the interactions in Montipora are of mild reactions.

Many aspects of interactions and relationships of coral genus Montipora still be left for further studies. The important aspects are as the following items :

1. The ultrastructure of fusion and non-fusion processes of tissue and skeleton.

2. Reproductive strategies of corals : sexual reproduction vs. asexual reproduction.

3. Population genetic structure measured by biochemical techniques.

4. Phylogenetic relationships among species of genus Montipora by using various characteristics for the interpretation.

The technique of coral transplantation can be applied for various aspects of coral reef studies, such as recovery of coral reefs, intraspecific variation of a coral and monitoring environmental change.