CHAPTER 5

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

Embryonic development, larval development and early growth of hatchery-produced of abalone seed and Effect of different macroalgal diets on growth of juveniles abalone, *H. ovina* were studied.

The results could be concluded as follow:

1. Broodstock, *H. ovina*, started to release gamete in 3 hours 20 minutes (males prior to females) and lasted about 15 to 20 minutes with UV irradiated sea water techniques.

2. Egg diameter of *H. ovina* with egg membrane is about 180 μm. clearly smaller than that of temperate species but it is in the same range as those of subtropical and tropical abalone

3. Embryonic development, larval development and early growth of juveniles, *H. ovina* is clearly faster than other Haliotid species

4. At 29 $^{\circ}$C, embryonic and larval development period of *H. ovina* are shoter than low temperature (23-25°C)

5. Developmental stages of *H. ovina* larvae are not difference from other Haliotid.

6. Abalone larvae, *H. ovina*, appear fourth tubule on the cephalic tentacle in 36 hours after fertilization. At this stages, they are ready to settle.

7. Early growth of three months old juveniles, *H. ovina*, are very close to growth rate of other tropical species but clearly faster than those of subtropical and temperate species.

8. Weaning stage of juveniles, *H. ovina* starts about 3 months after fertilization. At this stage they can consume *G. changii* and *E. intestinalis* as food.

9. In this experiment, juveniles, *H. ovina* which fed with *G. changii* showed significantly higher in specific growth rate than *E. intestinalis* and *Euchema* sp.

10. *E. intestinalis* can be used as food for juveniles but with lower growth rate than *G. changii*. *Euchema* sp. is not a suitable food for juveniles, *H. ovina* caused from high mortality and poor growth.

11. Macroalgae which has high protein content may also produce the high protein content in body composition of juveniles in this study.

12. Texture of macroalgae might be one of the causes for the difference in the growth rate

13. There are problems on year-round supply of *G. changii* to support mass production of juveniles, *H. ovina*.

RECOMMENDATIONS

1. Broodstock conditioning should be study in order to solve problem on seasonal maturity of wild-caught abalone, *H. ovina*.

2. Washing and decanting egg of *H. ovina* musr be avoided due to fragile egg membrane.

3. Researches on optimum sperm density for fertization and optimum temperature in larval rearing should be carried out.

4. To reduce mortality of larvae during development, cleaning culture sysrem and effective larvae rearing apparatus should be designed .

5. More information on effect of antibiotic on diatom plates and water quality improvement in culture system are require to improve mortality rate of early growth juveniles.

6. More research on growth pattern of hatchery produced abalone from post settlement to attain market size (more than 4 cm.) should be carried out.

7. Study on feeding efficiency and feeding rate are necessary. They should be carry out in the future.

8. It is necessary to search an adequate fresh macroalgae sources.

9. Further study on development of appropriated artificial diet is essential to replace fresh macroalgaes.