ABSTRACT

CHAIR RANI. Sexual reproduction of scleractinian corals Acropora nobilis and Pocillopora verrucosa at Barrang Lompo Island’s tropical coral reef, Makassar. Supervised by Dedi Soedharma, Ridwan Affandi, Suharsono, and Muhammad Eidman (Alm.).

Indonesian coral reefs, located within the Indo-pacific region, are well known as having the highest coral biodiversity in the world, which consists of 79 genera and 450 species. For example, especially for the genera of Acropora itself, there has been 91 species recorded in Indonesian reefs. Regardless these corals are very diverse around the archipelago; there has been no comprehensive data about their reproductive aspects. On the other hand, this information is very crucial for better coral reef management.

This study aimed: (a) to investigate the presence and condition of eggs in various coral branches of A. nobilis; (b) to describe several aspects of coral reproduction such as sexuality, gonad development, reproductive strategy, duration and periods of coral reproduction, and reproductive behavior of A. nobilis and P. verrucosa; (c) to know the relationship between time of reproduction and moon-phase and tide; (d) to determine season and peak of reproduction (reproductive cycle); (e) to understand the relationship between reproductive intensity and environmental factors (air temperature, water temperature and salinity, rainfall intensity, and solar radiation intensity); and (f) to describe environmental factors, most likely becoming signals for initial gametogenic of A. nobilis and P. verrucosa.

The researches were conducted for one year (January – December 2002) at Barrang Lompo Island’s fringing reef, Makassar. This study involved in situ observation on coral reproduction in the field and also involved histological approach to understand gonad structure, condition, and development, as well as to estimate season and peak of reproduction (the reproductive cycle) of coral A. nobilis and P. verrucosa.

The results of the study showed that polyps at the central part of the coral branches had the highest number of eggs compared to those at the apical and basal parts. In terms of sexuality, both corals A. nobilis and P. verrucosa were revealed as simultaneous hermaphrodite with broadcast spawning as the strategy of reproduction. Both corals had similar gonad developments, where the size of their gonads increased intensively at the final stages of their developments. Acropora nobilis spawned both at full moon and dark moon, although they spawned more intensive and synchronous during dark moon. While, P. verrucosa spawning only at dark moon during neap tide and took place from late afternoon until late night (18.00 – 22.00 pm), when the tide was going down. Although their spawning periods were not significantly different, spawning duration of A. nobilis was significantly longer compared to that of P. verrucosa. In terms of reproductive behavior, A. nobilis released their gametes as bundles consisting of a pair of egg and sperm, while P. verrucosa released their eggs and sperms separately at the same time. Both corals had two periods of reproductive seasons annually. For A. nobilis, first reproductive period took place from December to April with peak season in February and second reproductive period took place from August to October with peak season in August. While coral P. verrucosa, its first reproductive period took place from January to May with peak season in March, and second reproductive period took place from June to September with peak season in September. The higher intensity of reproduction (e.g. high fecundity) seemed to be attributed to the high intensity of rainfall and radiation, low salinity, as well as intermediate water and air temperature. Although
both corals preferred to spawn at relatively low salinity in wet season (November-March), it seemed that both corals also spawned at relatively high salinity in dry season (August-September). While changing in salinity and temperature may only act as supporting factors affecting reproductive season, I suggest that the increase of nutrients both during rainy season and at the end of dry season may play the major role (ultimate factor) on the initial of gametogenic.