PRELIMINARY STUDY ON CORAL FISH SPECIES IN COASTAL ECOTOURISM WATERS OF THE RUBIAH ISLAND

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ABSTRACT

Preliminary study had been conducted on species of coral fish which lived with association in coastal ecotourism waters of the Rubiah Island, Sabang Municipality, Nangro Aceh Darussalam Province in period of pre tsunami 2004. The aims of the preliminary study were expected to collecting the initial data about dominance species of coral fish with estimation of its population. The survey for data collecting was conducted with visual census on species of coral fish with quadratic plot method on line transect with horizontal and vertical position from coastal line. Species data of coral fish were analysed with quantitative estimation on sums of individual per hectare. *Chaetodon* (4 species) was indicated as dominance genus among all species which lived with association on coral reef. *Chromis viridis* (8,375 individual/hectare), *Chromis dimidiatus* (1,000 individual/hectare), and *Dascyllus aruanus* (1,000 individual/hectare) had been indicated as species which had estimation with high population value on coral reef of coastal ecotourism waters of the Rubiah Island.

Keywords: species, coral fish, coastal waters, Rubiah Island

INTRODUCTION

Background

The ocean is the largest habitat on the earth with its various biodiversity. The potency of ocean biodiversity resources has not been utilized optimally yet. The ocean is potentially the resource of various nutrients and other goods for living of people; those are, for instance, in coral reef ecosystems, which have been utilized, as many as the resources of food (e.g. fish, shellfish, oyster, sea cucumber), drugs, cosmetic, and building matters (Dwiponggo, 1992 in Mayunar, 1996).

Some species of ocean biota highly have important values and have supported economic development. These are fisheries yields, e.g. skipjack, grouper fish, shrimp, crab, and other various species of ocean fish. Moreover, the ocean has an attractive panorama, so it has the potency for developing of ecotourism, e.g. the attractive coral reef with associating coral fish. Because the coral reef is the habitat for various species of coral fish, the protection of this habitat is needed (Adrim, 1996).

The coral reef has very important values and roles, from viewpoint of social, economic, and culture (Suharsono, 1996). These are caused by almost one-third people of Indonesia live at coastal zones and depending on abyssal fisheries for their living. The roles of the coral reef are as spaces of fish larvae of important economic value species in coastal waters and habitat of other various species. Therefore, these meant that the coral reef has high productivity.

The coral reef is also an ecosystem that is too sensitive habitat to environmental changes, e.g. temperature, salinity, and turbidity. This is mainly caused by people activity direct or indirect to the coral reef. The direct people activities are destructing and exploring of coral, animal coral, and coral fish with explosion. The indirect people activities are pollution of agriculture and industry activities. The destructions of the coral reef are also as the impact of ecotourism activities.

The coastal zone of the Rubiah Island, Sabang Municipality, Nangro Aceh Darussalam Province is a coastal ecotourism. By many activities of local and foreign tourists, if without the coastal environment and biodiversity resources management, these can cause destruction of the coral reef ecosystem, and then this destruction can decrease the population of coral fish. To know about the community of coral fish which lived with association in the coral reef ecosystem of coastal ecotourism waters of the Rubiah Island, the preliminary study, which was the first research, on the coral fish species in the coral reef ecosystem of coastal ecotourism waters of the Rubiah Island was needed to be conducted.

Problem Definition

The coral reef of coastal ecotourism can be destructed by the influence of various environmental factors. Before this destruction of the coral reef of coastal ecotourism waters of the Rubiah Island is going on, this is needed a policy of the management or conservation. Consequently, the accurate and the complete data of the coral fish community which live with coral reef ecosystem conditions are needed. Before these data are present, the preliminary data of the coral fish species as the references of long-term research on various aspects of the coral reef ecosystem in ecotourism waters of the Rubiah Island are needed.

Objective

The preliminary study aimed to collect preliminary data of coral fish species of the coral reef ecosystem, which were dominant in waters of coastal ecotourism of the Rubiah

Island; and to collect preliminary data of population estimation of coral fish species in waters of coastal ecotourism waters of the Rubiah Island.

Benefit

The preliminary study is expected that it can present the preliminary data of coral fish species, which are useful as the references of long-term research on coral fish species and its population estimation in coastal ecotourism waters of the Rubiah Island.

MATERIALS AND METHODS

Place and Date

The preliminary study had been conducted on the coral reef ecosystem of coastal ecotourism waters of the Rubiah Island, Sabang Municipality, Nangroe Aceh Darussalam Province. The preliminary study had been conducted during 17 to 23 November 1996, which were in the period of pre tsunami 2004.

Materials and Equipment

The study materials and equipment were coral fish specimens, snorkel, fin, roll meter 40 m, pencil, underwater paper, and mica clipboard.

Methods

The preliminary study used the survey method. The observation on coral fish species used the method of quadratic plot on line transect. The variables were coral fish species and individual number of fish species per hectare of coral reef area. In this preliminary study, the data were collected from two line transects, these were one vertical line transect and one horizontal line transect based on the coastal line. The observation on coral fish was done on 40 quadratic plots 1 m^2 on each line transect vertically and horizontally based on the coastal line. These numbers of line transects had not been the appropriate transects to take conclusions about the coral fish community comprehensibly yet; however, these only could be concluded about tendency of data that were collected at the study location.

Procedure

The observations on the coral fish species were conducted by putting on the line transects and the using roll meter 40 m. The line transects were drawn vertically and horizontally based on the coastal line in depth of range 1 m up to 3 m. The observations on

the coral fish species were done on quadratic plot 1 m x 1 m to right and left sides from line transect. On each quadratic plot, the observation on the coral fish species was done. The area of observation was 1 m to front side, 0.5 m to right side and 0.5 m to left side from line transect. The coral fish species was observed by census visually and directly be identified at the field together with the researcher staff of the Centre for Research in Marine Sciences, Indonesian Institute for Sciences. Besides that, identification of coral fish species was also done with the reference Kuiter (1992). The coral fish specimens caught were injected by formalin 37% into each fin, and then the specimens were collected by formalin 4% in the bottles after all fins be hard and good performance.

Analysis

The data of coral fish species which lived with association in coral reef community of coastal ecotourism waters of the Rubiah Island were analyzed quantitatively on the estimation of individual number per hectare of coral reef community area.

RESULTS AND DISCUSSION

The observation of coral fish species in coastal ecotourism waters of the Rubiah Island from all over the quadratic plot on line transects vertically and horizontally based on the coastal line showed that there were 14 species of coral fish. The species of coral fish which were often found, including the genus *Chaetodon*. The species of coral fish that had high value of the estimated population were *Chromis viridis* (8,375 individuals/hectare), *Chromis dimidiatus* (1,000 individuals/hectare), and *Dascyllus aruanus* (1,000 individuals/hectare) (Table 1).

The results obtained by observation of coral fish species also did not reflect the coral fish community in general due to very limited sampling, that were one transect for each way of sampling method both vertically and horizontally to the coastal line. However, these results indicated the dominance of genus *Chaetodon* among the coral fish species associated with coral reef community in coastal ecotourism waters of the Rubiah Island. The results also indicated that species *Chromis viridis, Chromis dimidiatus,* and *Dascyllus aruanus* had the high value of estimated population in coral reef community of coastal ecotourism waters of the Rubiah Island.

Table 1. The observation of coral fish species from all over the quadratic plot on line transects vertically and horizontally to the coastal line.

No.	Species of Coral Fish	Number of individual		
		Quadratic plot	m^2	Hectare
1	*Chromis viridis*	67	0.8375	8,375
2	*Chromis dimidiatus*	8	0.1000	1,000
3	*Dascyllus aruanus*	8	0.1000	1,000
4	*Chaetodon gutatissimus*	6	0.0750	750
5	*Chaetodon vagabundus*	3	0.0375	375
6	*Chaetodon trifasciatus*	2	0.0250	250
7	*Chaetodon falcula*	2	0.0250	250
8	*Plectroglyphidodon dickii*	3	0.0375	375
9	*Acanthurus leucosternon*	1	0.0125	125
10	*Pomacentrus moluccensis*	1	0.0125	125
11	*Scolopsis bilineatus*	1	0.0125	125
12	*Scarus sp*	1	0.0125	125
13	*Parupeneus barberinus*	1	0.0125	125
14	*Arothron nigropunctatus*	1	0.0125	125

The observation of coral fish species were also in line with the research of coral fish in the waters of Weh Island, Sabang Municipality which showed the indicator fish species (order Chaetodontidae), among others, dominated by *Chaetodon guttatissimus* and *Chaetodon trifasciatus.* Other fish (major group) included in the dominant species was genus *Chromis* of order Pomacentridae. Some of the species of coral fish are as the ornamental fish and tourism objects (Adrim & Djamali, 1995).

Fish community structure in a local area tends to follow the structure of coral communities in the area, in addition to local environmental conditions (Suharti, 1996). Dominant species at depth of 3 meters, among others, are *Chromis viridis* and *Dascyllus aruanus,* whereas the dominant species at depth of 10 meters, among others, *Dascyllus aruanus.* At a depth of 3 meters, *Dascyllus aruanus* is also found significant positive relation with the percentage of substrate (coral branching). This is consistent with the nature of life that the coral fish need the living space between the branches of coral. Fish abundance increases in line with increasing live coral cover. It is true that the more complex of substrate type follows by the higher of fish species diversity. Complex substrate provides a great variation for shelter and feeding habitat (Suharti, 1996). Complex life on the coral reefs also led to competition among species of coral fish in obtaining living habitat, because the most coral fish live very dependent on the substrate as a shelter and feeding ground. Territory ownership greatly affects the use of space. The space is more important

resource which is as the main limiting factor for coral fish abundance than the food (Sale, 1980; Carpenter *et al.,* 1981 in Suharti, 1996).

The dominance of fish in a place can also be determined by the condition of waters and suitable habitat for fish life. Between the numbers of individual fish and substrate cover type is closely related (Luckhurst & Luckhurst, 1978 in Suharti, 1996). *Dascyllus aruanus* which lives in the group has the widest distribution among the species in his genus. The species of genus *Dascyllus* like the fertilized area which is grown by live coral reef (Allen, 1975 in Suharti, 1996).

To indicate the coral fish species comprehensibly so that data can indicate the coral fish species more actual than this preliminary study, the number of transects need to be multiplied, those are one transect horizontally and one transect vertically based on coastal line on each coastal side of coastal ecotourism waters of the Rubiah Island.

CONCLUSION AND SUGGESTION

Conclusion

It was indicated that the genus *Chaetodon* dominated the coral fish species which lived with association in the coral reef community of coastal ecotourism waters of the Rubiah Island. It was indicated that species *Chromis viridis*, *Chromis dimidiatus,* and *Dascyllus aruanus* had the high estimation value of population in the coral reef community of coastal ecotourism waters of the Rubiah Island.

Suggestion

It is needed to conduct the continuation research on coral fish species and estimation of its population in coral reef community of coastal ecotourism waters of the Rubiah Island so that the data can indicate the coral fish species and estimation of its population actually. The way is with multiplying the number of transects and their location, those are one transect horizontally and one transect vertically based on coastal line on each coastal side of coastal ecotourism waters of the Rubiah Island. Consequently, it is needed to conduct a long-term research.

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