ISBN 978-979-792-546-8

Catch Composition and Size distribution of the spiny lobster (*Panulirus* spp*)* Related to Oceanography Parameters of the Southern Coast of South Sulawesi

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ABSTRACT

Spiny lobsters (*Panulirus* spp) are economically important crustaceans due to their value as a food. The spiny lobster caught generally by traps and bottom gillnets sometimes by divers support significant commercial catches along the South Sulawesi coast. The objective of the present study was to analyses Catch composition and Size distribution of the spiny lobster related to oceanography parameters. The study was conducted from March to August 2014 on the south coast of Bulukumba, South Sulawesi. Bottom gillnet was used in this study to catch the spiny lobsters Oceanography parameters such as temperature, salinity, and current velocity were used to relate the lobster catch from the coastal fishing grounds during the fishing season. Catch composition of spiny lobsters consist of*P.ornatus*47.5 %, *P. homarus*25.8 %, *P. versicolor* 21.2 %, *P. penicilatus* 11 %. Carapace length of *P. ornatus* with most of the individuals sized from 41-50 mm, *P.homarus*51-60 mm, *P. versicolor* 41-60mm, P. penicilatus41-50 mm. The Oceanography parameters recorded from the fishing ground during fishing period were well within the optimum ranges such as temperature (27-29ºC), salinity (30-31 ‰), and current velocity (004-0.09 m/sec).

Keywords: *spiny lobster, bottom gillnet, oceanography parameters, catch composition, size distribution*

INTRODUCTION

Spiny lobsters are economically important crustaceans and are among the most highly prized and invertebrate fishery resources in the country. Their value as a food and an economic resource comes from their reputation as a highly desirable food source for the world over. They widely distributed, its natural range includes the Indo-west Pacific region from the Red Sea to east Africa (south to Natal) to southern Japan, the Solomon Islands, Papua New Guinea, S.W., N.W., N.E. and E Australia, New Caledonia and Fiji and has been recorded from catches from between 1 and 50 m depth from coastal and coral reef areas throughout this range (Holthuis, 1991).

In spite of its wide distribution, an in-depth study on many fundamental aspects of the biology, ecology and fishery of spiny lobster is lacking in the marine of South Sulawesi. Many communities currently rely on the additional income provided by the wild fishery for Spiny lobsters but acknowledge that opportunities to increase yield are unlikely. The objective of the present study was to analyses Catch composition and Size distribution of the spiny lobster (*Panulirus* spp.*)* related to oceanography parameters in southern Bulukumba coast, South Sulawesi.

MATERIALS AND METHODS

The study was conducted from March to August 2014 on the south coast of Bulukumba, South Sulawesi (Fig. 1). The coast presents extensive sand beaches with some gravel-sand patches, while large areas offshore are covered with gravel-sand. The study area was substratum type with mostly a sand and rare rubble seabed. Algae were often abundant particularly (*Euchema* spp.) were common

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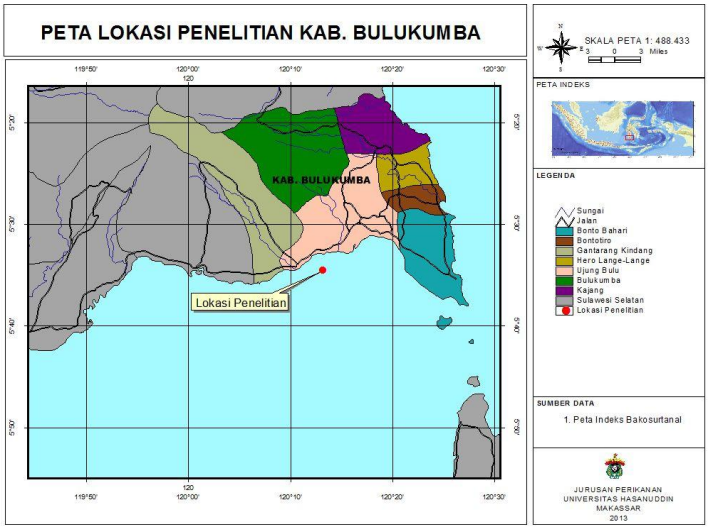

Figure 1. Map of the study area in the south coast of Bulukumba, South Sulawesi, Indonesia.

Spiny lobsters were captured in traps and bottom gill nets sometimes by divers in the area. Mean while bottom gillnet was used in this study to catch the spiny lobsters. They have stretched meshes size of 10 cm, lengths between 150 m and a height 1.5 m. The nets are left in the water for 24 h (one fishing day).Lobsters caught with bottom gillnet nets from depths of approximately 0.5-10 m were sampled at random every month from Marc to August 2014. The oceanography parameters including sea temperature, salinity and current velocity of fishing grounds was measured in each fishing operation.

The target species was determined according to the catalogues of Holthuis (1991), lobster was identified with color contour in body segment (Holthuis, 1991 and Chan, 2000). The catch composition of all species was describedPoole (1974) Bengen (2000):

$$P = \frac{ni}{N} x100\%$$

Where

P = Persentase one speices caught spiny lobster

ni = Total one speices caught spiny lobster

N = Total all species speices caught spiny lobster

Carapace length (CL) were measured along the mid dorsal line, from the transverse ridge between the postorbital spines to the posterior edge of the carapace with a caliper (± 0.1 mm).

RESULTS AND DISCUSSIONS

Catch Composition. There are four species reported in this study including (*P. ornatus, P. homarus, P. versicolor, P. penicilaltus*. (Fig. 2). A total of 257 spiny lobster were caught from March to July 2014,, of which 114 (44.4 %) belonged to the species *P. ornatus*, 91 (35.5 %) to *P. homarus*, 16 (21.2 %) to *P. versicolor* and 11 (4.3 %) to *P. penicilaltus*. The observed relative proportions of these lobster species showed an inversion during the study period. Individuals of *P. ornatus* were the most frequently caught

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and following of *P. homarus* and *P. versicolor* while *P. penicillatus* constituted the lowest frequently caught. So, *P. ornatus*is the most important spiny lobster and *P. homarus* is the second most important spiny lobster in the study area.

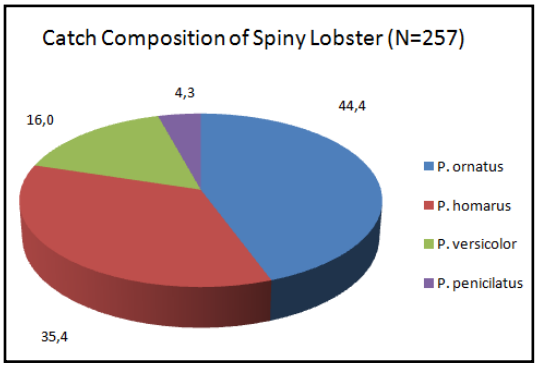

Figure 2. Catch composition of spiny lobster (*Panulirus* spp) during fishing period in south coastal of Bulukumba South Sulawesi.

The fisheries-dependent data collected in this study are considered quite representative of the wildpopulation. Both *P. ornatus* and *P. homarus* are reef dwelling species, most abundant on coral and coastal fringing rocky reefs and the areas surrounding them. Both are less commonly found in inshore areas of a sedimentary nature, indicating their broad environmental tolerances that make them suitable for aquaculture. They are found indepths of 1 to 50 m. The juvenile and adult stages of both species are omnivorous, grazing primarily on small crustaceans, molluscas, worms and algae. They are generally nocturnal, most active from dusk through to dawn.Both are highly social, preferring to congregate in groups in hollows, caves and crevices within and beneath the reef structures.

Size distribution. The size of spiny lobster individuals ranged from 26 to 70 mm CL during study period. (Fig.3, 4, 5, 6). with most of the individuals sized of *P. ornatus* from 26 to 50 mm CL with most of the individuals sized 41-50 mm. The lobster *P. homarus* ranged from 21 to 70 mm CL of, with most of the individuals sized from 51 to 60 mm CL. The lobster *P. versicolor* ranged from 21 to 60 mm CL of, with most of the individuals sized from 51 to 60 mm CL. The lobster *P. penicilatus* ranged from 21 to 50 mm CL of, with most of the individuals sized from 41 to 50 mm

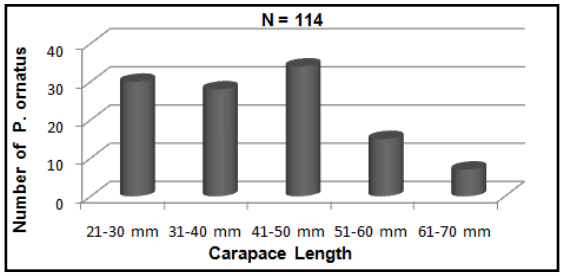

Figure 3. Size-frequency distributions of *Panulirus ornatus* by 10- mm-CL size classes during study period in southern coast of South Sulawesi

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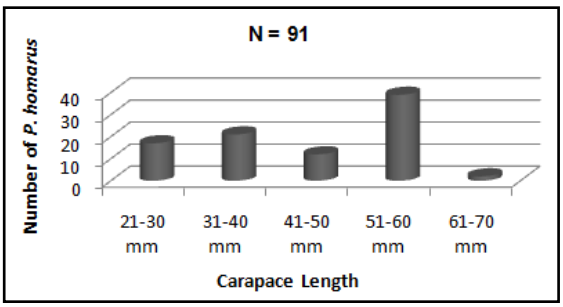

Figure 4. Size-frequency distributions of *Panulirus homarus* by 10- mm-CL size classes during study period in southern coast of South Sulawesi.

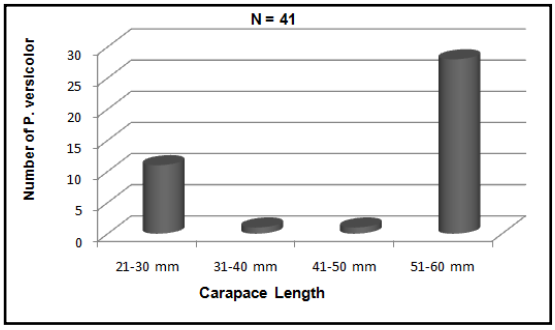

Figure 5. Size-frequency distributions of *Panulirus versicolor* by 10- mm-CL size classes during study period in southern coast of South Sulawesi.

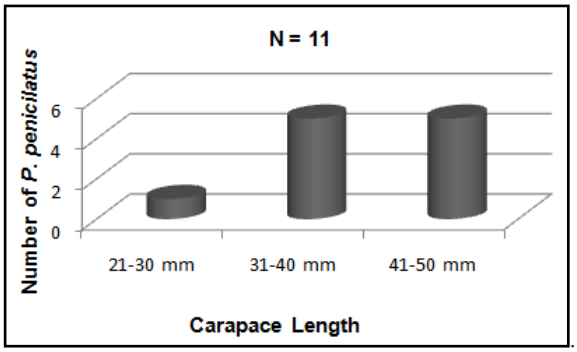

Figure 6. Size-frequency distributions of *Panulirus penicilatus* by 10- mm-CL size classes during study period in southern coast of South Sulawesi

The fisheries-dependent data collected in this study are considered quite representative of the wild population. This is indicated that the pattern of movement of lobsters along the shore could be factors influencing the size composition of the catch. Although the bottom gillnet indiscriminately target all lobsters using mesh size bottom nets due to their high value regardless of size.

Oceanography Parameters. The oceanography parameters recorded from the fishing ground during the fishing operation were presented in Figure 7, 8, 9.

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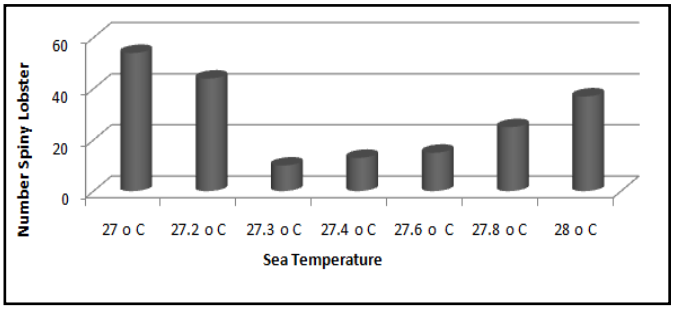

Figure 7. Number of spiny lobster relate to sea temperature during study period in southern coast of South Sulawesi.

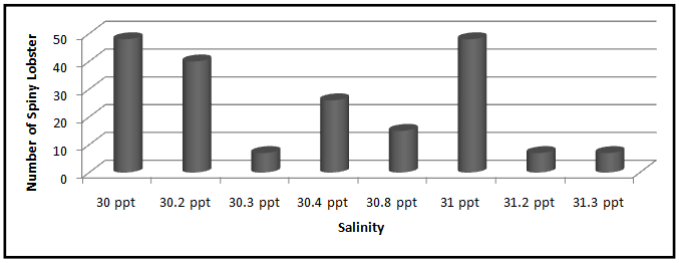

Figure 8. Number of spiny lobster relate to salinity during study period in southern coast of South Sulawesi.

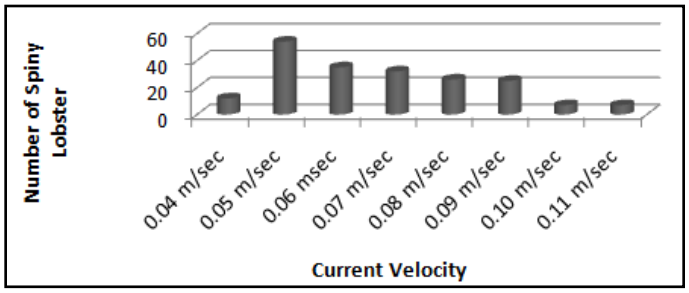

Figure 9. Number of spiny lobster caught relate to current velocity during study period in southern coast of South Sulawesi.

The study shows water temperature ranged from 27ºC to 28ºC. The highest catch was occurred in water temperature 27 ºC. Water temperature is an important environmental factor enhancing growth and reproductive cycle of lobster (Ikhwanuddin *et al*., 2016). Salinity ranged from 30-31.3 ppt. Salinity is one of the major factors that may significant affect the physiology of aquatic organism, for example, a reduction in salinity resulted in increased haemolymp total protein and haemocianin plasma level in *Homarus americanus* (Jury *et al*., 1994) and similarly, lower salinity caused significant increase in oxygen consumption in *Penaeus japonicas* (Noga, 2000).

The study shows that current affect on number of spiny lobster caught. The highest catch was occurred in current speed 0.05 $msec^{-1}$. In contras with, the lowest catch was occurred in current speed 0.11 $msec^{-1}$. Current velocity play role in fish catch operation. It is necessary to pay attention to current velocity during fishing operation. The fish abundance of *Aluterus monoceros* was affected by current in which the strongest current speed the lowest fish assemblage (Demster, 2005). Fish assemblage around culture area decrease with increase current speed (Bergman *et al*., 2001).

The oceanography parameters recorded from the fishing ground during the fishing operation were well within the optimum ranges for lobster. The optimal oceanography parameters reported for lobster farming are: temperature (26-33ºC), salinity (25-35‰), pH (6.8-8.5), (Philips *et al*., 1980; Van Olst *et al*., 1980; Kittaka, 1994).

ACKNOWLEDGEMENTS

The author thanks Ansar and Idris for their help in field sampling activities. Commercial samples were obtained from catches of the fishermen in south coastal of Bulukumba Regency, South Sulawesi. This project was supported by the Directorate General of Higher Education, Republic of Indonesia.

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