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Behavior And Feeding Habit of Dog Conch (Strombus turturella) in South Bangka Regency, Bangka Belitung Islands Province

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Abstract

Dog conch (Strombus turturella) is one of important sources of fishery commodities with high economic values in Bangka Belitung. The needs of Dog conch as consumption still depends on fishermen harvest since its aquaculture has not been cultured until now. This study aims at determining behavior and feeding habit of dog conch. The study was conducted in July 2014 to January 2015. The experiments passed some stages 1) samples was taken in the field by hand collecting, 2) the experiment of seagrass consumed preference, 3) feeding behavior, and 4) Analysis of the stomach contents. The results indicate dog conch does not consume seagrass immediately, but detritus and microalgae species of Thalassiosira sp., Synedra sp., Nitzschia sp., Navicula sp. Dog conch eats by put the probiosis of the shell, then it grinds sediment layer, seagrass leaves and shells of other individuals as source if food. Dog conch behavior from beginning to ending of the observation includes several stages: 1) Initial treatment actively foraging, 2) Individuals dog conch assembled or in pairs, 3) on the second day, the dog conch hoards himself on the base of the substrate and only elastic probiosis which occasionally appear occasionally at the substrate bottom.

1. Introduction

Dog Conch is commonly known as siput gonggong by local people in Bangka Belitung Islands, Riau Islands, and in the Johor strait, Malaysia (Amini and Pralampita, 1987; Cob, et al., 2009; Dody, 2011). It consists of three species in the Strombus genus; Strombus turtella, Strombus canarium, and Strombus

urceus (Cob, et al., 2009; Dody, 2011). Among the three species, Strombus turturella more closely resembles Strombus canarium morphologically than the other Strombus genus (Cob, et al., 2009). In Indonesia, dog conch (Strombus turturella) is only found and reported around Bangka Belitung Islands and Riau Islands, but it could be found in other places in Indonesia (Dody and Marabessy, 2007; Dody, 2011).

Dog Conch (Strombus turturella) has been one of the most important fishery commodities and has become people livelihood in Bangka Belitung islands. Its meat has high economic value and usually use it as various meals such as siput gonggong crispy chips, and the fresh meat also serves as special menu in restaurants (Arularasan, et al, 2010; Dody, 2011). Unfortunately, its meat stock still depends on fisher's commercial harvest until now. This condition causes over exploitation which declines the population. Moreover, sea mining activities have the habitat destruction (Dody and Marasabessy, 2007; Dody 2011). Fishing regulation and aquaculture for Dog conch commercial catch are the best solution to prevent it from over fishing continuously and to increase its population stock in nature.

The spawning process has been conducted as experiment of dog conch aquaculture, but it resulted in low survival rate (Dody, 2012). It was caused by predator attacked in larval stage and natural food of this species which is still unknown (Dody 2012; Supratman, 2015). Research about behavior and feeding habit of Dog conch (Strombus turturella) have not been conducted. On the other hands, the research about behavior and feeding habit of other species such as Strombus canarium and Strombus gigas have much more been conducted for aquaculture activities (Stoner and waite, 1991; Zaragoza, et al., 2009; Cob, 2014). This research is to inform the behavior and feeding habit of dog conch for aquaculture activities of this species.

2. Materials and methods

a) Field Sampling

This research was conducted from July 2014 to January 2015. The samples were taken in seagrass ecosystems around Tukak, coastal village, in the South Bangka Regency, Bangka Belitung Islands Province (020 58 '09,5' 'SL and 106039'12,7' 'LE) (Figure 1). The Samples were some seagrass species and water substrate. The samples were hand collecting and then stored in storage box. To analyze dog conch stomach, the inner organs must be separated from the shells, then the inner organs was preserved by using 50% alcohol. The samples were also taken to analyze the consumed preferences and its feeding behavior. The research was performed in laboratory.

b) The Experiment of Seagrass Consumed Preference

This experiment was carried out by using an aquarium with 60x50x40 cm. The experimental aquarium used glassy separators as a bulkhead for each seagrass species (Figure 2). This experiment had two treatment by using substrate of natural habitats and without using substrate, each treatment was done in three repetitions. These experiments using six seagrass species such as Enhalus acoroides, Cymodocea serrulata, Halodule uninervis, Halodule pinifolia, Halophila minor, Halophila ovalis and six individuals of dog conch. To find the food consumed, there were conducted several stages according to Zupo et al (2001) references: 1) starvation of the dog conch for 24 hours, 2) weighing each seagrass species to initial biomass, 3) treatment; put the seagrass grown of dog conch in every barrier aquarium and 4) the final biomass weighing of seagrass was to determine the plant consumed. In additional, seagrass was calculated to quantify and characterize the seagrass leaf morphologically before and after the treatments. The results of these experiments to determine the preferences of dog conch on seagrass species consumed.

c) The Experiment of Feeding Behavior

The experiment was conducted by taking grown seagrass substrate to make aquarium as well as natural condition of dog conch habit. Physic-chemistry parameter was conducted to keep the water quality covering temperature, salinity, pH and soluble oxygen. To increase soluble oxygen condition, there were four aerations paired in each treatment. Observation was carried out every one hour in a first day (because on the first day of the dog conch still adapting in a new place, so it tends to be more active activities), then six hours for the next days. Feeding behavior observation was done in five days. The observation was about 1) kind of consumed food, 2) feeding behavior 3.) the dog conch behavior.

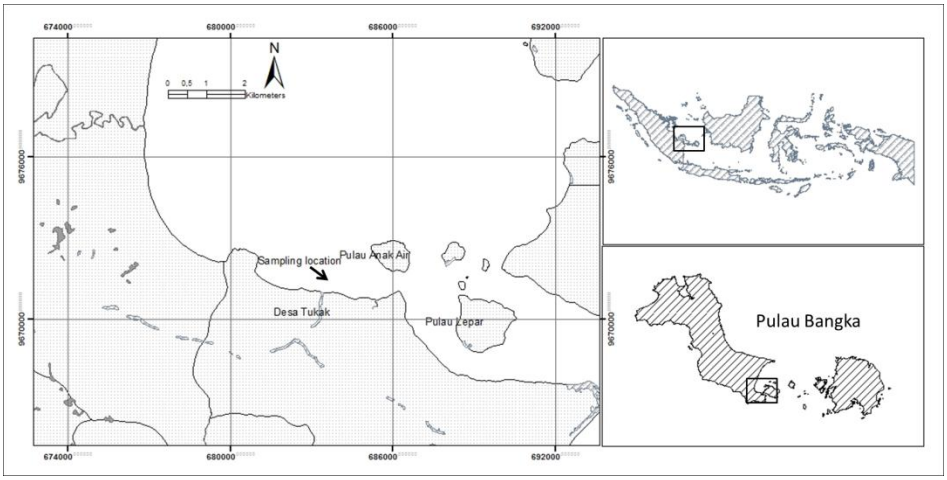

Figure 1. Map of sampling location (Source Map : Peta Rupa Bumi Indonesia)

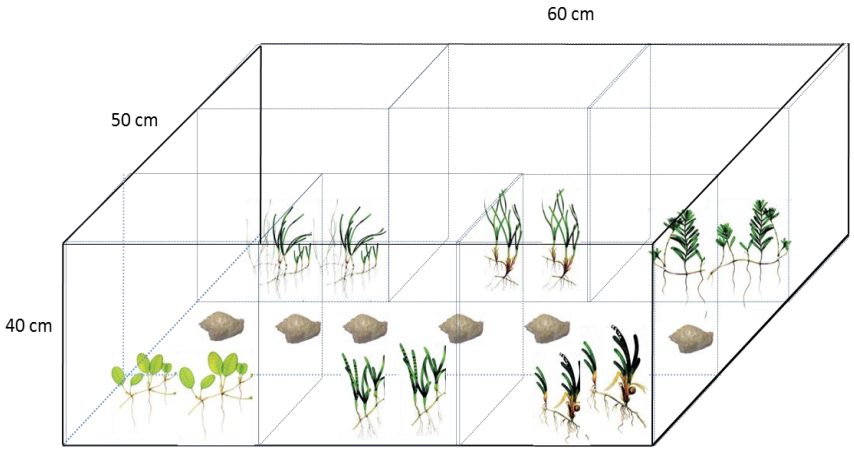

Figure 2. Experimental aquarium design of seagrass consumed preference

d) Stomach Analysis

The stomach was analyzed by separating part of stomach with other inner organs. All of stomach contents were taken out then were diluted by using aquadest. The next stage was observation and calculation of founded indviduals in dog conch stomach under light microscopy. The result was identified by detritus, plant fragment, fitoplankton, and zooplankton. Fitoplankton identification was conducted by referring Thomas (1997). The result of stomach content analysis was calculated by referring Natarajan and jhingran (1961) formula :

$$li = \frac{Vi\ Oi}{\sum(Vi\ Oi)} x\ 100\%$$

Where, Vi = percentage of various food item quantity, Oi = percentage of various food items occurrence.

3. Result

a) Seagrass Species Consumed Preference

There were six seagrass species used in this research as samples, it was found that biomass and amount of seagrass leaves were not changed (Table 1). Beside, the leaves also were not changed morphologically as dog conch biten as for consuming. The result showed that the dog conch did not consume the available seagrass immediately.

Table 1. Biomass and seagrass leaves amount before and after treatment

Seagrass Species	Biomass before treatment (gram)	Biomass after treatment (gram)	Leaves amount before treatment	Leaves amount after treatment
E. Acoroides	15,23	15,23	3	3
C. serrulata	4,97	4,97	20	20
H. uninervis	3,30	3,30	23	23
H. ovalis	1,33	1,33	16	16
H. minor	0,53	0,53	51	51
H. pinifolia	1,03	1,03	89	89

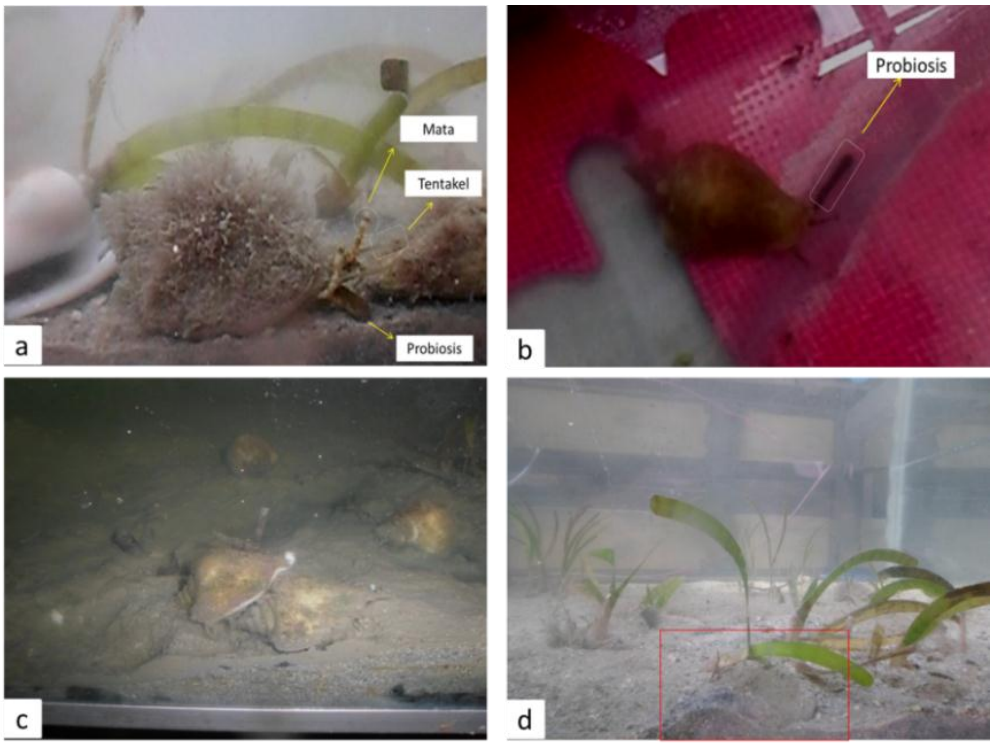

Figure 3. Dog conch behavior ; a) feeding activities,treatment by using substrate b) feeding activities without using substrate c) sexual activities behavior d) burrying behavior in substrate

b) Food Preponderance Index

Based on stomach content analysis, dog conch foods are detritus, sand,plant fragment, algae fragment, 13 genus of phytoplankton, and zooplankton. Dog conch main food was measurable by using food preponderance index (Natarajan and Jhingran, 1996). The highest index constitutes detritus (66,08%), then sand (23,35%) , microalgae genus Thalassiosira sp. (2,5930%) , Synedra sp. (1,8197%), plant fragment (1,7438%), macroalgae fragment (1, 3395%), and the rests are phytoplankton and zooplankton with small percentage (Table 2).

Tabel 2. Food Prepondence Index in dog conch stomach

Species	Total	*Vi*	*Oi*	*Vi*Oi*	*Ii*
Detritus	2615	64,31	100	6431,382	66,0888
Sand	924	22,73	100	2272,504	23,3522
Thalassiosira sp.	114	2,80	90	252,336	2,5930
Synedra sp.	80	1,97	90	177,078	1,8197
Seagrass fragment	69	1,70	100	169,7	1,7438
Macroalgae fragment	53	1,30	100	130,349	1,3395
Nitzschia sp.	56	1,38	80	110,182	1,1322
Navicula sp.	43	1,06	90	95,1795	0,9781
Thalassionema sp.	44	1,08	30	32,464	0,3336
Rhizosolenia sp.	33	0,81	40	32,464	0,3336
Guinardia sp.	11	0,27	50	13,527	0,1390
Asterionella sp.	5	0,12	50	6,148	0,0632
Cocconeis sp.	7	0,17	30	5,165	0,0531
Striatella sp.	7	0,17	10	1,721	0,0177
Leptocylindrus sp.	2	0,05	10	0,492	0,0051
Cymatopleura sp.	1	0,02	10	0,246	0,0025
Fragilaria sp.	1	0,02	10	0,245942	0,0025
Zooplankton	1	0,02	10	0,245942	0,0025

4. Discussion

The experiment on seagrass consumed preference showed that the biomass, amount of the leaves, and morphological seagrass are not changed before and after the experiment. It proves that dog conch does not consume seagrass preference immediately. Observing result also showed that dog conch prefer consuming its feces to the available seagrass. Its stomach contained detritus, sand, diatomic microalgae, plant fragment, and macroalgae fragment which proves that dog conch does not consume the plant immediately but detritus metamorphose of organic material. In the previous research about Strombus gigas and Strombus canarium species, they mostly consumed detritus which derived from seagrass and macroalgae (Stoner and Walte, 1991; Cob et al., 2014). Although sand is not an important nutrition for dog conch, it is found in its stomach. In feeding process, dog conch grinds sediment layer which contained sand and it consumed the food with sand all together inadvertently during the process happened. Then, the eaten sand is loosen through anus to aquarium base without substrate.

Microalgae found in its stomach were Thalassiosira sp., Synedra sp., Nitzschia sp., Navicula sp.These Species are diatom (Thomas, 1997). Genus of Nitzschia sp., and Navicula sp. and Synedra sp. are diatom as alive larva sticking on seagrass leaves (Lukatelich and McComb, 1986; Kasim and Mukai, 2006). On the other hand, species of Thalassiosira sp. is pelagic diatom living in water column. Althought it is pelagic, the diatom also can be found on sediment surface since its cells easy to precipitate (Kasim and Mukai, 2006). Beside, the genus also can be found in a

specific area dominantly (Kasim and Mukai, 2006). This condition cause microalgae taken along feeding process. Microalgae is also main nutrition for dog conch beside detritus. According to (Stoner and Walte, 1991; Cob et al., 2014), detritus does not satisfy strombus genus, so it needs another nutrition source such as algae. The results showed that microalgae genus of Thalassiosira sp., Synedra sp., Nitzschia sp., Navicula sp. can be natural food of dog conch in cultivation process, since it is perifitonic and contain a lot of nutritions than detritus. Beside those, the microalgae is able to cultivate massively and it has been natural food of bivalvia culture, gastropoda and sea fishes (Lavens and Sorgeloos, 1996).

5. Conclusion

Dog Conch (Strombus turturella) does not feed seagrass immediately but detritus and microalgae species of Thalassiosira sp., Synedra sp., Nitzschia sp., Navicula sp. Its feeding behavior by put tentacle, eyes and probiosis from shell, then it grazes on sediment layer, seagrass layer and other individual shells as source of food.

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