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FOOD PREFERENCE ON *TELESCOPIUM TELESCOPIUM* (MOLLUSCA : GASTROPODA) BASED ON FOOD SOURCES IN MANGROVE ECOSYSTEM

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Abstract

Bacteria has a important role on mechanism nutrition and energy on ecosystem. The research was conducted September 2016 – July 2017. This purpose research was to determine a various food type on gastropods in mangrove ecosystem. The relationship between gastropod and mangrove productivity using Correspondence Analysis (CA). the sediment was taken with depth ± 10 cm and leaf litter was taken a litter trap 1 m x 1 m. The result showed that based on a chain food cycle that happened in mangrove ecosystem and tropic level. Gastropod *T. telescopium* choosed a food on mangrove sediment. *T. telescopium* has a similiar in bacteria *Staphylococcus aureus*.

Key words : Bacteria, leaf litter, mollusca, soil sediment.

Introduction

Banggi coast is located on the North Coast of Java, Central Java, Indonesia. The Banggi coast in Rembang, Central Java is fringed by various species of mangrove such as *Rhizophora mucronata* Lam., *Rhizophora apiculata* Blume, *Rhizophora stylosa* Griff and *Sonneratia alba* Sm (Ariyanto *et al*., 2018a). The mangrove ecosystem is a region rich in organic matter. The presence of microbes have an important role in the mechanism of preserving nutrients and energy in mangrove ecosystems (Rajendran and Kathiresan, 2007; Sahoo, 2009; Kathiresan, 2011). The mangrove ecosystem can be found various types of microbes (Lin *et al*., 2001; Gayathri *et al*., 2010; Boopathy and Kathiresan, 2010) and can be used as hosts for living sites (Strobel *et al*., 2004). Bacteria were the most dominant microbes found and there were symbiotic with diverse organisms such as plants, insects, and marine invertebrates (Clerk *et al*., 2010; Cavanaugh *et al*., 2013). The existence and bacteria diversity in mangrove ecosystems were caused by salinity, pH, physical, climate, vegetation, nutrition and location (Hrenovic *et al*., 2003).

Bacteria can be found on marine organisms. Gastropods have the highest abundance in the mangrove ecosystem. Gastropods perform symbiosis at various tropical levels to adapt with environmental conditions. Gastropods demonstrate a variety of feeding and morphological strategies and are found in areas that utilize many food sources so that there will be a symbiosis (Bates, 2007). Gastropods and bacteria have an important role in environmental ecology and biogeochemistry. Bacteria are directly in the cells of the invertebrate host to be used as an improvement energy from metabolism and biomass (Cavanaugh *et al*., 2005; Stewart *et al*., 2005). The feeding activities of gastropod play an important role in the transport and degradation of organic matter in flat intertidal. The organisms used a combination of leaves and suspension for food from various sources to maximize food and nutrient intake (Chaparro *et al*., 2002). Bacteria can be found in mangrove sediments. The purpose of this study was to determine the food type of gastropod based on bacterial similarity in Rembang District, Central Java Indonesia.

Materials and Methods

Sample sampling

The research was conducted on September 2016 - August 2017. Samples were taken in Coast of Banggi Rembang Central Java, Indonesia (6'42'5 S and 111'23'16 E). Samples consisted of mangrove leave, sediment dan gastropods. Sediment was taken using a soil sampler at a depth of ±10 cm, mangrove leaves was taken using a litter bag and gastropods samples were taken using square sampling. Gastropods consisted of *Telescopium telescopium.*

Bacteria identification

The research of bacteria identification was conducted on Bacteriology Laboratoty, Veterinary Faculty, Bogor Aqricultural University, Bogor, Indonesia. The samples were diluted up, inoculation performed by pour plate method. Furthermore petri dishes were incubated for 2 × 24 hours. The colonies of bacteria, which were formed on each petri dish from each dilution were isolated that showed different morphology. Isolation and purification of bacterial isolates were performed by the method of scratches (streak method). The determination of various bacteria can be obtained by morphological test, gram staining, catalase test, oxidation test and motility.

Analysis data

All data were obtained using Correspondence analysis (CA) to analyze various food based on similiarity a bacteria between gastropod with sediment and /or mangrove leave. Analysis in row matrix (various bacteria) and colom (gastropods). Analysis was conducted to use *Xlstat* 2016 program.

Results and Discussion

Table 1 shows the types of bacteria that are found to determine the type of gastropod food. The bacteria were found to contain 7 types of bacteria such as *Bacillus cereus*, *Pseudomonas aeruginosa*, *Bacillus sphaericcus*, *Staphycococcus aureus*, *Pseudomonas aeruginosa*, *Staphylococcus aureus*. *Telescopium telescopium* type was the same type of bacteria *Pseudomonas aeruginosa*, *Staphylococcus aureus*. These bacteria can be found in the food type of mangrove leaf litter and mangrove sediments. It showed that *T. Telescopium* belongs to omnivore gastropods.

This statistical test used Correspondence analysis (CA) in determining the relationship of type of gastropod with the level of feeding type of mangrove leaves or mangrove sediments. Fig. 1 shows the proximity pattern of gastropod with the type of bacteria present in the

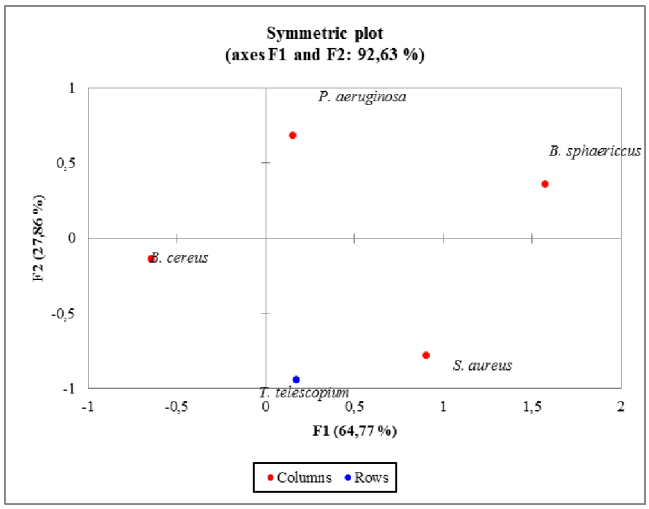

Fig. 1 : Correspondence Analysis (CA) on determination of various food with bacteria.

Table 1 : Bacteria on *T. telescopium* in Rembang District, Central Java, Indonesia.

No.	Sample	Bacteria
1	Mangrove leave	*Bacillus cereus*, *Pseudomonas aeruginosa*
2.	Mangrove sediment	*Bacillus cereus*, *Bacillus sphaericcus, Staphycococcus aureus*
3.	*T. telescopium*	*Pseudomonas aeruginosa, Staphylococcus aureus*

sediments and mangrove leaves. The picture had F1 (64.77%) and F2 (27.86%). The picture showed four groups between gastropod and bacteria. Group 1 consisted of *T. telescopium* with *S. aureus*. It illustrated that gastropods had a level of feeding in sediments.

Microorganisms play an important role in decomposing organic matter and producing protein-rich detritus that serves as food for biota in the mangrove ecosystem. Active role of bacteria was needed in decomposition process in mangrove ecosystem (Kurniawan, 2012). The bacteria decomposed the litter enzymatically through the active role of proteolytic, cellulolytic and chitinoclastic enzymes. Proteolytic group bacteria play a role in the process of protein decomposition such as Pseudomonas, while the bacterial groups that play decompose chitin included Bacillus, Pseudomonas (Lyla and Ajmal, 2006). The litter of mangrove leaves containd enutrients because of microbes during the decomposition process (Sheaves and Molony, 2000). The genus Bacillus consisted of a gram-positive that has been distributed in various environments. *Pseudomonas aeruginosa* was a type of gram-negative bacteria that normally inhabits soil and surface in the environment

(Gellatly and Hancock, 2013). Staphylococcus was a microbial of Micrococcaceae with Gram-positive staining with animal habitats. *S. aureus* was classified as anaerob, *S. aureus* can produce toxin at 37°C. The presence of E. coli bacteria mainly indicated waste contamination in the mangrove ecosystem (Chandran *et al*., 2013).

The mangrove ecosystem is closely related to the presence of bacteria present in soil sediments that play an important role in carbon, sulfur, nitrogen, and phosphorus cycles in ecosystem mangroves (Toledo *et al*., 1995, Rojas *et al*., 2001). The importance of microbes that was produced by detritus in the mngrove region acting as a major substrate for bacterial growth. Environmental mangrove ecosystems can affect the presence of bacteria in sediments (Holguin *et al*., 2001). The presence of bacteria in mangrove sediments fluctuates depending on temperature, pH, redox potential, water and sediment salinity (Holguin *et al*., 2001) and contributes to the degradation of organic matter and controls the recycling of essential nutrients in sediments (Alongi, 1994). Sediment in the mangrove ecosystem was predominantly *Bacillus* and *Pseudomonas* bacteria according to the characteristics of the soil salt. The high density and diameter breast of height supported the abundance of gastropods (Ariyanto *et al*., 2018c). Davies *et al.* (2011) suggested suctioning of microorganisms in sediments may provide some sort of protection from bacterial effects of solar radiation, high salinity, toxicity, and heavy metals.

T. telescopium consumed leave mangrove and soil sediment. Theresa and Fye (1986) that the clustering behaviour of *T. telescopium* may be an additional adaptation to dry conditions, high temperatures and clearly associated with tidal inundation. MacNae (1968) suggested *T. telescopium* is characteristically found in soft muds in the Rhizophora forest, on the surface of the mud in shallow pools and on the muddy banks of creeks. Ariyanto *et al*. (2018b) showed that dynamism and daily behavior affected by availability and quality of mangrove forest comprised of leaves production, organic matter, species varieties and leaves-aging variety.

Conclusion

T. telescopium is characteristically found in sediment. It showed that filter feeder type.

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