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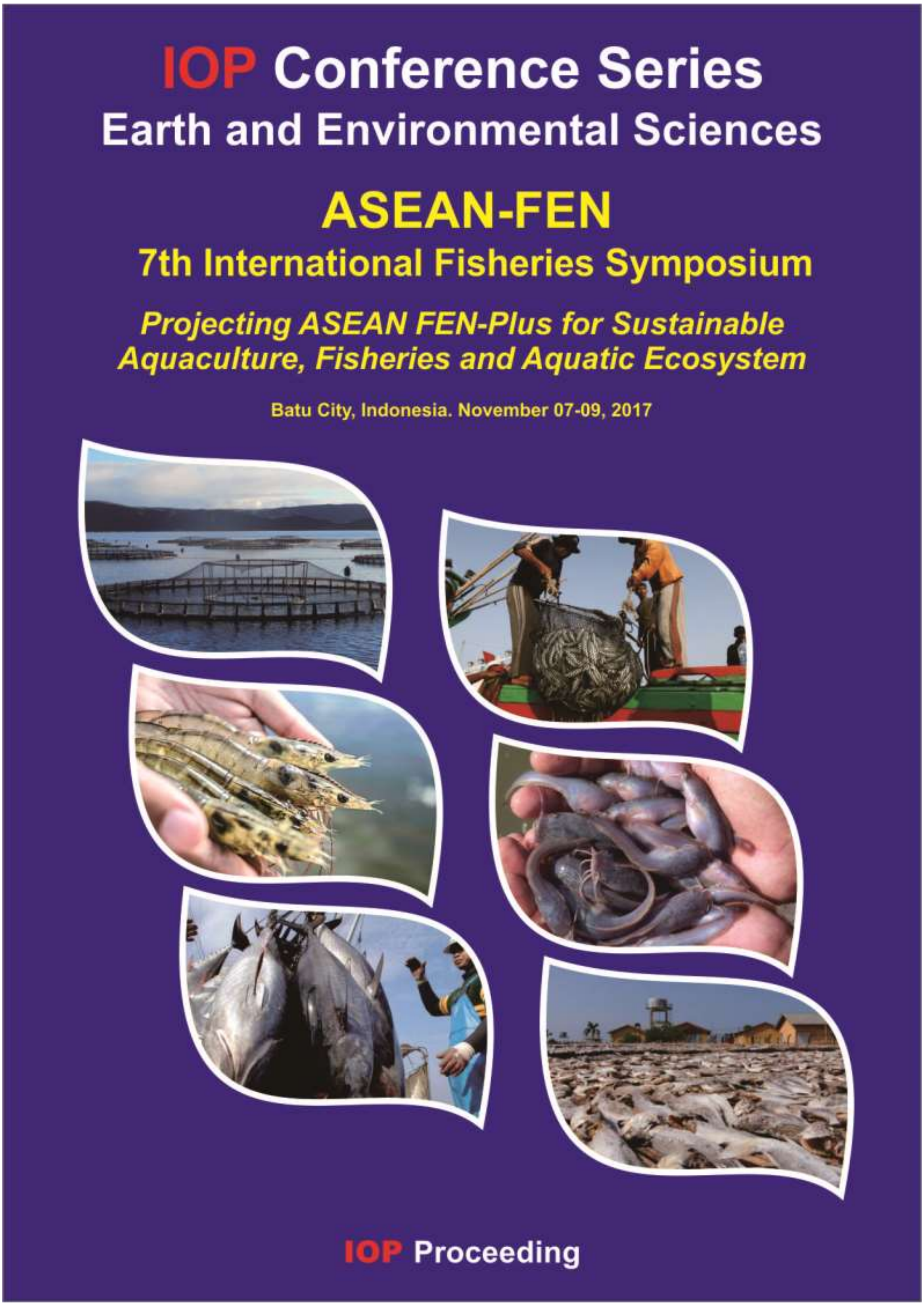

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Preface

The 7th ASEAN-FEN International Fisheries Symposium was successfully held in Batu, East Java, Indonesia 7 – 9 November 2017. The conference was hosted by Faculty of Fisheries and Marine Science, Brawijaya University Malang Indonesia. The theme of this symposium was "Projecting ASEAN FEN Plus for Supporting Sustainable Aquaculture, Fisheries and Aquatic Ecosystems", with focus on the advanced innovation to address to the newly emerged issues in aquaculture, fisheries and aquatic ecosystems for the synergies between socioeconomic development and protecting natural resources and the environment**.**

The conference was attended by over 500 researchers from different countries, who presented and discussed the results of their work within the framework of five main areas: 1. Aquaculture, 2. Sustainable fisheries and management, 3. Seafood processing and biotechnology, 4. Aquatic resources, biodiversity and environment, and 5. Fisheries Economic.

ASEAN-FEN IFS 2017 Committee received more than 120 manuscripts from participated universities and research institutes, and 106 manuscripts were accepted for publication. All of the papers were subjected to peer-review by qualified experts in the field selected by the conference committee. The papers selected depended on their quality and their relevancy to the conference.

We would like to thank all the authors who have contributed to this volume and also to the board members, organizing committee, reviewers, speakers, chairpersons, sponsors and all the conference participants for their support to the ASEAN-FEN IFS 2017.

Warm Regards,

Dr.Sc. Asep Awaludin Prihanto, S.Pi., MP.
Chairperson of ASEAN FEN, IFS 2017
Faculty of Fisheries and Marine Science,
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The identification of plankton tropical status in the Wonokromo, Dadapan and Juanda extreme water estuary

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The identification of plankton tropical status in the Wonokromo, Dadapan and Juanda extreme water estuary

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Abstract. Wonokromo, Dadapan and Juanda estuaries are extreme waters located around Surabaya environment. This is because of a lot of organic material intake, which provided nutrients for plankton growth. In addition, the waters is also dynamic in reason of physico-chemical, geological and biological processes controlled by the tides and freshwater run-off from the river that empties into it. The objective of this study was to identify the presentation of plankton in extreme waters based on brightness and ammonia level. The study was conducted in January 2017. Three sampling locations were Wonokromo, Dadapan and Juanda estuaries. Each station consists of three points based on distances, which were 400, 700, and 1000 meters from the coastline. The brightness in Wonokromo, Dadapan, and Juanda environment was 60, 40, and 100 cm, respectively. The result of ammonia in Wonokromo, Dadapan, and Juanda estuary was 0.837, 0.626, and 0.396 mg/L, correspondingly. Nine classes of phytoplankton's were found in three locations (bacillariophyceae, dynophyceae, chlorophyceae, cyanophyceae, crysophyceae, euglenoidea, trebouxlophyceae, mediophyceae, and nitachiaceae) and five classes of zooplanktons (maxillopoda, hexanuplia, copepoda, malacostraca, and oligotrichea). The density of plankton in Wonokromo, Dadapan and Juanda environments, was 37.64, 63.80, and 352.85 cells/L, respectively.

1. Introduction

The fertility of waters can be seen from the existence of plankton. According to Sofarini [1], stated that the presence and density of phytoplankton is one indicator of the fertility of the aquatic environment. According to Hemraj *et al*. [2], also stated that planktons are a bio-indicator of the water conditions of coastal lagoons. This indicator is performed by measuring the concentration of the chlorophyll produced by plankton.

The plankton density in waters is influenced by a number of environmental parameters and physiological characteristics. The composition and plankton density change at various levels in response to changes in physical, chemical, and biological conditions. These include physical and chemical changes such as the intensity of light, dissolved oxygen, temperature stratification, and the availability of nutrients, nitrogen and phosphorus; while the biological aspect is the existence of animal predation activities, death, and decomposition [3].

The east coast of Surabaya is located in the northwestern part of Madura Strait, covering the area between Tambak Wedi village and the Dadapan river estuary (border area with Sidoarjo). The waters of the east coast of Surabaya can be regarded as extreme waters due to several factors. One of the factors is that there are approximately 10 rivers that empties into it [4]. These waters make the coastal waters of Surabaya's east coast an estuary area with an input of numerous organic material intake as nutrients for the growth of plankton. Moreover, the coastal waters of Surabaya's east coast can be considered as very dynamic waters because there are various physical-chemical, geological and biological processes controlled by the sea water tides and freshwater run-off from the rivers that empties into it.

According to Winarni *et al*. [5], have stated that the structure of communities in the east coast of Surabaya have led to the discovery of seven types of sea cucumbers with high to low distribution indexes, none very high. According to Affandi *et al*. [4], mentioned that there were four species of *kupang* (local name) and one *lorjuk* (local name) species in the east coast waters of Surabaya with a distribution that did not occur spontaneously or randomly but were closely related to preferences or selection of suitable habitats.

This research is a preliminary study to provide basic data and will be continued in several parts. The research aims to assess the extreme coastal waters of Surabaya with extreme water condition and high organic material which have dominance, diversity and plankton density. Extreme waters with good fertility will have a variety of species and good plankton density as well. Therefore, a study on the identification and fertility levels of plankton in the extreme waters in the east coast of Surabaya was carried out.

Seawater as public waters may at any time experience changes in conditions and quality caused by surrounding environmental factors, weather, climate as well as human activities conducted on these waters. Changes that occur in sea water will cause fluctuations in water quality such as temperature, salinity, water brightness (turbidity), degree of acidity (pH) and dissolved oxygen (DO). Changes that occur to water quality will influence the sustainability of aquatic organisms. Planktons are one of the most influential organisms in extreme water conditions [6].

Some types of plankton are able to survive and grow in extreme waters. Plankton is able to adapt to extreme environments. According to Seckback [6], explained that some algae are able to survive under conditions of low temperature, high temperature and high salinity waters. Tolerant organisms that can adapt to extreme waters will easier adapt to within the culture.

Research from Hemraj *et al.* [2], stated that coastal lagoons are characterized by extreme environments especially high salinity. This is led to community changing. Studies have been performed which have used plankton as an indicator of extreme environmental fluctuations. Two different communities of phytoplankton and zooplankton were identified, with salinity and nutrients being the main factors affecting species distribution. Polychaete and gastropod larvae showed positive indicators of high salinity fluctuations.

2. Methodology

The study was conducted in January 2017. The research included field observations and laboratory analysis. Sampling was carried out in the coastal waters of Surabaya on three stations, where each station consisted of three points. The identification of plankton samples were performed at the Dry Laboratory of the Faculty of Fisheries and Marine at Airlangga University, Surabaya and the water sample was measured there.

The research material used was plankton found in the Wonokromo, Juanda and Dadapan waters. The research materials used were 4% formalin, lugol, walnut nutrient ($NaNO_3$, Na_2EDTA, H_3BO_3, NaH_2PO_4, $2H_2O$, $FeCl_3$, $6H_2O$, $MnC1_2$, $4H_2O$), vitamin solution stock, stock of micro metal solution (BBPAP Jepara), sea water chlorine (Brataco), Na Thiosulphate (Brataco), alcohol (Brataco) paper, gloves and masks.

The equipment used in the research were: sample bottles, plastic clips, bottle insulation, gel ice, GPS, styrofoam, aerator set, aerator hose, cork, measuring cup, Erlenmeyer, dropper, volume pipette, microscope, homogenizer, hand tally counter, autoclave American 25H, Haemocytometer, Sedgwick-Rafter, Spectrophotometer, Hettich EBA-20 centrifuge, hot plate stirrer, refractometer, pH paper, thermometer, ammoniac test kit, DO test kit, Ohaus PA 2102 digital scales, OHAUS digital scales, Analytical Balance PA413, TL 40 watts, cotton, water funnel, gauze and aluminum foil.

The plankton identification books used were: Freshwater Algae Identification, Enumeration and Use as Bioindicators [10]; Methods for the Study of Marine Benthos (Athlete of March) Ostracods, and Chaetognaths [16]; Algae [9]; Identifying Marine Phytoplankton [22]; and Plankton: A Guide to their Ecology and Monitoring for Water Quality [3].

Plankton and water samples were obtained from three stations in Wonokromo, Juanda and Dadapan waters. Each station consisted of 3 water sampling points at a distance of 200, 500, 800 meters from the coastal waters.

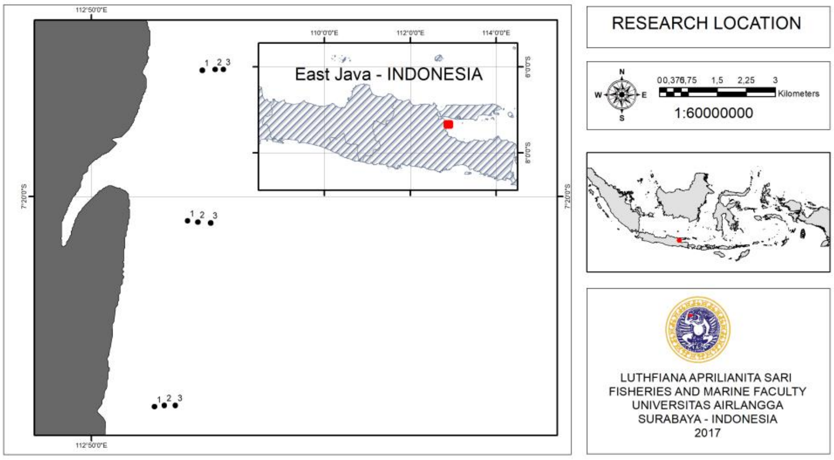

Figure 1. Research location and sampling site at Wonokromo, Dadapan and Juanda waters.

2.1. Sample collection

The sampling of plankton and water was done at each sampling location. Sampling of microalgae (phytoplankton) was carried out using a 10 μm diameter plankton net. Zooplankton sampling was done using a 80 μm diameter plankton net. First, 50 liters surface water was filtered by a plankton net in each station. Then the filtered water was put into a sample container. The ordinate sampling station was recorded. Bottles were labeled with information such as times, dates, points and sampling stations. Two sample bottles were collected at each sample site location, one bottle of sample was preserved by using lugol (sample for density calculation and plankton diversity), while the other contained a sample without additional preservatives but stored in a gelled ice coolbox (sample for plankton insulation) [3].

The identification of samples was perfomed at the laboratory of the Faculty of Fisheries and Marine at Airlangga University. Plankton analyses was determined by dripping 1 ml of sample water on the haemacytometer, then observed under the microscope with 100 enlargement. The checking of parameters of water samples such as Dissolved Oxygen (DO), temperature, brightness, current and pH were done directly at the sampling site.

2.2. Identification and Calculation of Plankton Density

The identification of the plankton is based on its morphological form observed by using a microscope [23].The identification of zooplankton is based on [16] the calculation of plankton density using the formula from [20], while the Calculation of Dominance Index and Diversity Index was calculated using the formula from [19].

3. Result and Discussion

The research data stated that the extreme waters at the locations of Wonokromo, Dadapan and Juanda was caused by the condition of water brightness. The brightness at 3 stations were 60 cm at Wonokromo, 40 cm at Dadapan and 100 cm at Juanda waters. Ammonia at the three stations were measured at 0.837 mg/L in the waters of Wonokromo, 0.626 mg/L in Dadapan and 0.396 mg/L in Juanda.

Figure 2. Location of sample waters.

The development of phytoplankton is determined by the intensity of sunlight, temperature and nutrients. The high growth of phytoplankton may not always be beneficial for aquatic conditions; it can also cause a population explosion (blooming), which can produce harmful toxic substances.

The structure of the phytoplankton community is a collection of populations that live in a particular region or habitat that interconnect and interact or have a reciprocal relationship of a particular zone [19]; this includes the index of diversity, index dominance, uniformity index and species wealth index (Kamali, 2004). The Shannon-Wiener species diversity index is a mathematical calculation that describes the analysis of information about the number of individuals in each species, the number of species and the total of individuals within a community (Masson, 1981). The uniformity index (ETIsability) is a description of the uniformity of the individual distribution of the phytoplankton species in a community [19]. Simpson's dominance index represents the presence or absence of a dominant species in a community. The disappearance of the dominant species causes a change in the biotic community and its physical environment [19]. The richness index is used to find out the least amount of taxa and the concentration of biota in a community (Margalef, 1951 in Romimohtarto, 2001).

From the sampling sites, we found 10 classes of phytoplankton (bacillariophyceae, dynophyceae, chlorophyceae, cyanophyceae, crysophyceae, euglenoidea, trebouxlophyceae, mediophyceae, nitachiaceae) and 5 classes of zooplankton (maxillopoda, hexanuplia, copepoda, malacostraca, oligotrichea). The density of plankton were 37.64 cells/liter in Wonokromo, 63.80 cells/liter in Dadapan, and 352,85 cells/liter in Juanda waters.

Phytoplankton have chlorophyll that the function in photosynthesis to produce organic and oxygen in the water, However, certain phytoplankton may degrade the quality of the waters if the amount is excessive (blooming). The high populations of toxic phytoplankton in waters can cause negative consequences for aquatic ecosystems, such as reduced oxygen in the water that can cause the death of various aquatic creatures.

Table 1. Identification of Plankton Density at the Wonokromo, Juanda, and Dadapan locations.

Species of	Wonokromo			Juanda			Dadapan		
Plankton	400 m	700 m	1000 m	400 m	700 m	1000 m	400 m	700 m	1000 m
Amphora		x	x					x	x
Amphidinium	x				x			x	
Bidulphia						x	x	x	x
Ceratium			x						
Chaetoceros		x	x	x	x	x			
Chromulina			x	x	x	x			
Coscinodiscus		x	x	x	x	x	x		
Cyclotella	x		x	x			x	x	x
Dynophisis					x				x
Dythilum			x		x				x
Euglena									x
Gymnodinium									
Lyngbia	x				x			x	
Naupli			x	x					
Navicula	x		x	x	x	x			X
Nitzchia		x	x		x	x			
Oocystis	x	x							
Oscillatoria	x	x			x		x	x	X
Parafavella				x	x	x			
Peridinium				x				x	
Planktoniella			x	x	x	x			
Pleurosigma				x				x	
Rhizosolenia	x	x	x	x	x			x	
Siola		x							X
Tabellaria		x			x				
Tintinopsis						x			
Thalassiothrix									
Skeletonema			x	x	x	x			

Phytoplankton can be found throughout the mass of water from the surface to a depth where it is still possible for the intensity of sunlight to be used in the process of photosynthesis. This phytoplankton is the largest flora component of its role as a primary producer in a waters [19]

4. Conclusion

Our gratitude goes out to the Faculty of Fisheries and Marine who have funded this research. We would also like to thank our team of researchers: both technicians in the laboratory and in the field. We hope that this research can be beneficial for future studies on this topic. The brightness in Wonokromo, Dadapan, and Juanda environment was 60, 40, and 100 cm, respectively. The result of ammonia in Wonokromo, Dadapan, and Juanda estuary was 0.837, 0.626, and 0.396 mg/L, correspondingly. Nine classes of phytoplankton's were found in three locations (bacillariophyceae, dynophyceae, chlorophyceae, cyanophyceae, crysophyceae, euglenoidea, trebouxlophyceae, mediophyceae, and nitachiaceae) and five classes of zooplanktons (maxillopoda, hexanuplia, copepoda, malacostraca, and oligotrichea). The density of plankton in Wonokromo, Dadapan and Juanda environments, was 37.64, 63.80, and 352, 85 cells/L, respectively.

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