

Habitat Condition and Diversity of Macrozoobenthos and Nekton Species in The Laut Mati Tasi Ana Rote Ndao Regency, East Nusa Tenggara

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Abstract

Lake Laut Mati Tasi Ana is located in Daeurendale Village, Landuleko Sub-District of Rote Ndao Regency East Nusa Tenggara Province. The conditions and characteristics of water habitat of this Lake greatly affect the diversity of existing biota. Insofar, data and information about the diversity of macrozoobenthos and nekton in this lake are still not available. This study aims to identify the diversity of macrozoobenthos and nekton that exist in the lake as well as their habitat condition parameters. The samples of data were collected from four predetermined stations of coordinate points (1.Oemasapoka, 2.Olokama, 3.Kaluoen, 4. Lolokaslain) by using cruise method. The study found that in this lake there exist eight species of macrozoobenthos which include Parathelphusaconvexa, Melanoidesturricula, M. tuberculata, M. maculata, Neritaundata, Mytilusedulis, Acar squamosa, Cerastodermaglaucum. Most of those macrozoobenthos belong to Gastropod class. In addition, there are four species of nekton namely Oreochormis niloticus, O. mossambicus, Paracheiroduon simulans, Channa sp. All of these nektons are found only in station 1 (Oemasapoka). It is conceivable as the water salinity of this station is 30 ‰ and the pH level is 9.29. Such condition allows the existence of the nektons.

Keywords: Diversity, Macrozoobenthos, Nekton, Lake Laut Mati, Tasi Ana, Daeurendale Village.

I. INTRODUCTION

Lake Laut Mati Tasi Ana is a salty water lake with white sand located in Daeurendale Village, Landuleko Sub-District, Rote Ndao Regency of East Nusa Tenggara with an area of approximately 12 square kilometers. The white sand is mixed with shells and snails. The lake is surrounded by hills and mangrove forests. Uniquely, fresh water fish are able to live and survive in this lake. Local residents also often fish in this lake. A previous study by Indonesian the Indonesian Institute of Sciences (LIPI) in collaboration with the local government reported that there is a different level of water salinity between the surface and the bottom of the lake. The level of salinity on the surface is higher than in the bottom. As a result a planned government salt production project could not be developed. However, no further study has been done to investigate more details about this lake.

The conditions and characteristics of the habitat of the lake greatly affect the diversity of existing biota. Biota is all living things that exist in the water, including both animals and plants. In general, biota is divided into three major groups, namely plankton, nekton, and benthos. According to Goltenboth (2012) ²macrozoobenthos are invertebrates, the general composition of macrobenthic invertebrates includes: Tubificidae (Oligochaeta), Simuliidae (Diptera), Hydropsychidae (Trichoptera), Chironomidae

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(Diptera), Ephemeroptera, Plecoptera, Coleoptera, Heteroptera, Odonata, Gastropoda (Prosobranchia) Bivalvia and Crustaceae (Decapoda). Nekton, on the other hand, are organisms that can swim and move actively, for example fish, amphibians and large water insects³. An important part of description of water quality includes a description of the distribution of temperature, salinity and dissolved oxygen parameters. These parameters cannot be separated in any research in water as they play important roles for aquatic biota⁴. because the weather conditions during the temperature measurement are relatively the same, so the temperature does not change. In general the temperature range is a normal range for aquatic life creatures including macrozoobenthos⁵. Internal factors that affect the distribution of temperature, salinity and dissolved oxygen are the depth and shape of the bottom topography of the lake⁴. Each lake has a different depth and bottom shape which causes the distribution pattern of salinity temperature and dissolved oxygen to be different. To obtain basic information, this study also measured the distribution of temperature, salinity, pH, and dissolved oxygen and their relationship with the depth of the lake as these data have not been available.

Similarly, insofar, data on the diversity of macrozoobenthos and nekton in this lake have not been compiled by any previous study. This study aims to identify such biota as the available of such data may contribute to resource management and conservation value of the area.

II. METHODS

In obtaining the data of this study, observation to and sampling of macrozoobenthos and nekton, and measuring abiotic factors (water temperature, air temperature, salinity, pH, DO, and BOD) at four predetermined stations (Station 1: Oemasapoka, Station 2: Olokama, Station 3: Kaluoen, Station 4: Lolokaslain) were carried out.

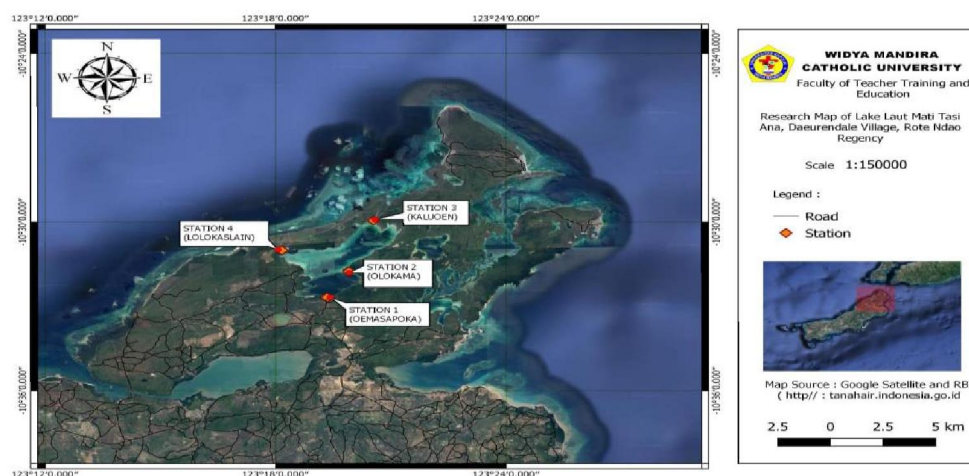


Fig 1. Map of the Research Location

Cruise method and purposive sampling were employed. By the cruise method, we roamed the four stations and measured the coordinate point of each. Note that for safety reason and provision of manpower in our research team, only four stations were determined. Meanwhile, by purposive sampling, samples of macrozoobenthos and nekton representing each station were taken. A fishing net was used to

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catch the samples of nekton. The compiled data were analyzed by identifying the name of species of macrozoobenthos and nekton and the effect of abiotic factors. Identification of macrozoobenthos and nekton were done by using identification key, description based on literature, comparative specimens (herbarium), photographs or pictures, as well as institutions / experts of plant and animal biota⁶.

III. RESULTS AND DISCUSSION

The Diversity of Makrozoobenthos and Nekton

The diversity of macrozoobenthos and nekton species found at the four stations are presented in the Table 1 below.

Table 1. Diversity of Macrozoobenthos and Nekton Species in Tasi Ana Dead Sea Lake

	Class	Station 1 Oemasapoka (S10°32'41.0"- E123°19'20.2") Elevation -8m	Station 2 Olokama (S10°31'45.5"- E123°19'54.6") Elevation -6m	Station 3 Kaluoen (S10°29'56.7"- E123°20'33.0") Elevation -2m	Station 4 Lolokaslain (S10°31'00.1"- E123°18'09.7") Elevation -10m
Macrozoobenthos	Crustacea	- <i>Parathelphusa convexa</i>	-	-	-
	Gastropod	- <i>Melanoides turricula</i> - <i>M. tuberculata</i> - <i>M. maculata</i> - <i>Neritaundata</i>	- <i>Melanoides turricula</i> - <i>M. tuberculata</i> - <i>M. maculata</i> -	- <i>Melanoides turricula</i> - <i>M. tuberculata</i> - <i>M. maculata</i> -	- <i>Melanoides turricula</i> - <i>M. tuberculata</i> - <i>M. maculata</i> - <i>Neritaundata</i>
	Bivalvia	- <i>Mytilusedulis</i> - -	- - -	- - - <i>Cerastoderma glaucum</i>	- <i>Mytilusedulis</i> - <i>Acarsquamosa</i> - <i>Cerastoderma glaucum</i>
Nekton	Osteichthyes	- <i>Oreochromis niloticus</i>	-	-	-
	Actinopterygii	- <i>O. mossambicus</i> - <i>Paracheirodon simulans</i> - <i>Channa sp</i>	- - -	- - -	- - -

This study reveals that in this lake there exist eight species of macrozoobenthos and four species of nekton. At station 1 with coordinate point S 10 ° 32'41.0" - E 123 ° 19'20.2" and elevation 8m, six types of Macrozoobenthos and four types of Nekton were identified. These six types belong to two families (arthropod & mollusk) and three classes (crustacean, gastropod, and Bivalve). Crustacean class of arthropod family includes *Parathelphusa convexa*. Gastropod class of arthropod family includes *Melanoides turricula*, *M. tuberculata*, *M. maculata*, and *Neritaundata*. In addition, Bivalve class of arthropod family includes *Mytilusedulis*.

The four types of nekton belong to osteichthyes class and actinopterygii class of one chordates family. The Osteichthyes class includes *Oreochromis niloticus* type. On the other hand, the actinopterygii

class includes *Oreochormismossambicus*, *Paracheirodonsimulans*, and *Channasp* (a kind of fish but its morphological characteristics do not give any clue to its type). It is noteworthy that the nektons are only found in this station.

At Station 2 (Olokama) with coordinate point S10 ° 31'45.5 "-E123 ° 19'54.6" and Elevation -6m, three types of Macrozoobenthos were found. The three types are *Melanoidesturricula*, *M. tuberculata*, and *M. maculata*. All belong to gastropod class of mollusk family.

At Station 3 (Kaluoen) with coordinate point S10 ° 29'56.7 "- E123 ° 20'33.0" and Elevation -2m, four types of macrozoobenthos that belong to two classes (gastropod and bivalve) of one family (mollusk) were found. Gastropod class includes *Melanoides. turricula*, *M. tuberculata*, *M. maculate*, *Neritaundata*. On the other hand, bivalve class includes *Cerastodermaglaucum*.

Similar to station 3, at station 4 (Lolokaslain) with coordinate point S10 ° 31'00.1 "- E123 ° 18'09.7" and Elevation of -10m seven types of Macrozoobenthos that belong to two classes (gastropod and bivalve) of one family (mollusk) were found. Gastropod class includes *Melanoidesturricula*, *M. tuberculata*, and *M. maculate*. In addition, the bivalve class includes *Mytilusedulis*. Suwignyo et al., (1998) 7 state that Gastropods are the most successful class and have a very wide distribution, ranging from tidal areas to a depth of 8,200 m. This is confirmed by Nybakken (1992)⁸ that the Gastropod class has the ability to adapt to drought and changing salinity and the degree of acidity (pH) of the soil due to the influence of sea water and fresh water.

1. Identification of the Types of Macrozoobenthos

The identification of Macrozoobenthicis done by matching the macrozoobenthic sample with the images contained in the FAO identification book (2002)⁹. The following figures are the species of macrozoobenthos found in Lake LautMatiTasi Ana:



Parathelphusa convexa

Melanoides turricula

M. tuberculata

M. maculata



Nerita undata

Mytilus edulis

Acar squamosa

Cerastoderma glaucum

2. Identification of Types of Nekton

The identification of nekton refers to several literature such as Kottelat et al. (1993)¹⁰, Wowor et al. (2004)¹¹ and Wowor (2010)¹². The following pictures are the types of Nekton found in Lake LautMatiTasi Ana:



Oreochormis niloticus



O. mossambicus



Paracheirodon simulans



Channa sp

3. Parameter of Habitat Condition of Lake Laut Mati Tasi Ana Habitat

The following table summarizes the parameter of habitat condition of Lake Laut Mat iTasi Ana represented by the four stations.

Table 2. Measurement Parameters of Tasi Ana Laut Mati Lake Habitat Conditions

Station	Salinity	DO/TDS	Water temperature	pH
1 Oemasapoka	30 ‰	975 ppm	28, 5°C	9, 29
2 Olokama	36 ‰	914 ppm	30.8°C	10.89
3 Kaluoen	36 ‰	853 ppm	30.2°C	9.52
4 Lolokaslain	36 ‰	709 ppm	27,7 °C	9.90

As this table shows, the level of water salinity, Dissolved Oxygen (DO), water temperature, and water acidity (pH) differ across the four Stations. The water salinity level of Station 1 is 30‰. This level is considered normal though it is lower than of the other three stations as in this station there is an influx of fresh water to the lake. This condition allows the distribution of nekton species and only one type of macrozoobenthos.

Furthermore, the Dissolved Oxygen (DO) and water temperature of the four stations also differ. The lowest of both factors is found at Station 4. In addition, the lowest water acidity level (pH 9.29) is found at Station 1. However, in average the pH level of the four Stations is classified as alkaline. The variation of such conditions result in uneven distributions of macrozoobenthos and nektons.

IV. CONCLUSION

This study uncovers a number of facts. First, there are eight species of macrozoobenthos and four species of nekton. Second, the identified nektons are only found at Station 1 with salinity level 30‰. Third, *Parathelphusa convexa*, a species of macrozoobenthos is only found at station 1. Fourth, the salinity level at Station 1 is lower than of the other Stations because of the influx of the fresh water to the lake.

V. ACKNOWLEDGMENTS

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