The various type of microalgae in lentic habitats

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Abstract. Microalgae are unicellular algae living in freshwater. Algae were carbon fillers and biomass generators, so they have an important function to balance the environment. Lentic habitats can change rapidly, especially the existence of various activities such as sedimentation, pollution of various pollutants originating from domestic and industrial activities. This research aims to identify various types of microalgae in lentic habitats. Sampling was conducted at four-month intervals from April to June 2019. This zone divided into ponds and pools because it mostly used a water supply around the lentic area. The population in this research was microalgae in lentic habitats. From the results of the study that lentic habitats were found 4 divisions such as Cyanophyta, Chlorophyta, Euglenophyta and Baccilariophyta, such as Chlorella sp, Gloecapsa sp, Oscillatoria sp, Scenedesmus sp, Oedogonium sp, Microspora sp, Coleochaete sp, Closterium sp, Cymbella sp, Navicula sp, Pinnularia sp, Synedra sp, Euglena sp, Phacus sp, Trachelomonas sp. The microalgae were found on lentic habitats very affected by physical factors such as temperature, pH, and light intensity.

1. Introduction
Microscopic algae are unicellular algae which living in water column or sediment. They can live individually or into groups. Algae have functioned as carbon fillers and biomass generators, which are groups of photosynthetic organisms in freshwater [1]. Algae are classified as more than a dozen major groups based on pigment composition, storage profile of products, and diversity of ultrastructural features. For an easy way to determine algae is by using molecular biology [2].

Another potential as Algae for food reserve for living things. Algae contributed to photosynthetic and source of the food chain for more than 70% of the world biomass [3]. Microalgae, as one of the ecological parameters, can provide an overview of the condition of the waters. Various research conducted in high diversity algae in aquatic ecosystem found 22 phytoplankton species including 11 species included in the Class Bacillariophyceae, Chlorophyceae, Cyanophyceae, and Euglenophyceae [4]. Then in Lubuk Linggau found 47 species divided into 42 genera, 27 orders and 5 divisions [5]. So based on these various research types of microalgae can be found in places and indicators for environment.

Suitable habitat will affect the pattern of species richness [6], so the richness of microalgae will be potentially developed as a source of food chain especially in aquatic. Microalgae in the diet of fish lower their price by 50% and increase the nutritional value in fish [7].

Freshwater habitats can be divided into two types; the lentic and lotic habitat. Lentic habitat is increasingly rich in nutrients if they are inundated for a long time. It is called standing (lentic) waters – particularly lakes and wetlands [8]. Lentic habitats can change rapidly, especially the existence of various
activities such as sedimentation, pollution of various pollutants originating from domestic and industrial activities. Environmental changes can cause by excessive nutrients in aquatic ecosystems, so it changes various types of microalgae found in lentic habitats. Eutrophication can affect fish resources, human health, and ecosystem function.

Dry period very affected on drying is a natural disturbance in rivers and ponds across all biomes [9], aquatic drought causes a decrease in diversity in lentic habitat. However, drought does not affect the contribution of turnover and gradient richly to beta diversity [10]. So based on this statement, drying will be affected on diversity because drying will change many physical factors for environments such as temperature, water acidic (ph), and light intensity, and it affected various types of microalgae in aquatic. This research aims to identify various types of microalgae under the effect in dry period in lentic habitats.

2. Research Method
Sampling was conducted at four-month intervals from April to June 2019 in the Lentic area. It performed 7 samples in six sets in each zone, while the details of the implementation include determining systematic sample points in lentic habitat with divided by 7 zones in observation in Figure 1. This zone divided into ponds and pools because it mostly used a water supply around the area.

The population in this research was all microalgae species in the lentic habitats. The sample included microscopic algae, which were netted through plankton net, then step of research were ; (a) determining sample points systematically in lentic habitat, (b) observing algae by microscope and repeating 6 times. (c) capturing microalgae by photomicroscope (d) describing each type of microalgae. (e) analyzing related to the type, classification, and morphological characteristics by matching the results of microalgae found during observations with various kinds of literature. Literature used by Edmondson (1976), Belcher and Swale (1976), and Bellinger & David (2010).

Information :
Zone 1 : pond on open space
Zone 2 : pond on open space
Zone 3 : Pool on FKIP
Zone 4 : Pool on FKIP
Zone 5 : pond Faculty of Law
Zone 6 : pond on SBC
Zone 7 : pond on FKIP

Figure 1. Study Area for Microalgae

Microalgae sampling was performed at each point with a depth of up to 30 ml vertically drawn upwards as much as 30 ml. Sampling is carried out in the morning by measuring water temperature, water brightness, and water pH.
3. Result and Discussion

The result of Various Types of Microalgae in Lentic Habitat is as in table 1.

Table 1. Various Type of Microalgae in Lentic Habitat

| Divisi       | Class      | Order         | Family      | Genus    | Species          |
|--------------|------------|---------------|-------------|----------|------------------|
| Cyanophyceae | cyanophyceae | Chrococcales | Oocystaceae | Chlorella | Chlorella sp     |
| Cyanophyceae | cyanophyceae | Chrococcales | Microcystaceae | Gloeocapsa | Gloeocapsa sp   |
| Cyanophyceae | cyanophyceae | Oscillatoriae | Oscillatoriae | oscillatoria | Oscillatoria sp |
| Chlorophyta  | chlorophyceae | Sphaeropleales | Scenedesmacea | Scenedesmus | Scenedesmus sp  |
| Chlorophyceae | Sphaeropleales | Oedogoni-um | Oedogoniaceae | Oedogonium sp | Microspora sp   |
| Chlorophyceae | Coleochaetales | Coleochaetales | Coleochaetales | coleochaete | Coleochaete sp   |
| Baccilariophyta | cymbelalles | Desmidiales | Closteriaceae | Closterium | Cymbella sp      |
| Baccilariophyta | naviculales | Naviculaceae | Naviculaceae | navicula | Navicula sp      |
| Baccilariophyta | Euglenophyceae-cae | Fragilarieae | Fragilarieae | synedra | Synedra sp      |
| Baccilariophyta | Euglenophyceae-cae | Euglenaceae | Euglenaceae | Euglena | Euglena sp      |
| Baccilariophyta | Euglenophyceae-cae | Euglenaceae | Euglenaceae | Phacus | Phacus sp      |
| Baccilariophyta | Euglenophyceae-cae | Euglenaceae | Euglenaceae | Trachelomo-nas | Trachelomonas sp |

Based on table 1, it is known that in the lentic habitats were found 4 divisions such as Cyanophyta, Chlorophyta, Euglenophyta, and Baccilariophyta. Then Physical Factor in research showed in table 2.

Figure 2. (a) Chlorella sp, (b) Gloeocapsa sp, (c) Oscillatoria sp, (d) Scenedesmus sp, (e) Oedogonium sp, (f) Microspora sp, (g) Coleochaete sp, (h) Closterium sp, (i) Cymbella sp, (j) Navicula sp, (k) Pinnularia sp, (l) Synedra sp, (m) Euglena sp, (n) Phacus sp, (o) Trachelomonas sp
Table 2. Physical factor For Microalgae

| Parameters        | Zone 1-2 | Zone 6 | Zone 5 | Zone 3-4 & 7 | Parameter optimum |
|-------------------|----------|--------|--------|--------------|------------------|
| Temperature (°C)  | 29       | 28     | 25-26  | 27-28        | 20-30*           |
| Light intensity   | 27-48    | 10     | 36-58  | 41-54        | >45*             |
| pH                | 7.2-7.5  | 7.0-7.3| 6.1-6.6| 6.9-7.2      | 7.8-5*           |

Information:
* Asmawi (2006)

Based on the table, it is known that in the lentic habitats were found 4 divisions such as Cyanophyta, Chlorophyta, Euglenophyta, and Bacillariophyta. Cyanophyta is a yarn-shaped alga with body structure. It has Greenish blue in the cell, autotroph without chromatophore. Based on research were found 3 species such as a) *Chlorella* cells are round measuring 2-12 µm and do not have flagella so they cannot move actively. Chlorella has chlorophyll, storing food reserves pyrenoid [11]. b) *Gloeocapsa* is covered by mucus, in a round shape consisting of cells. *Gloeocapsa* similar to *Chrococcus*, but the cell is smaller. Sometimes cells look bright red in the form of a mass of rocks [12]. c) *Oscillatoria* sp. form by filament with a blunt tip, on one end of it is covered with mucus, tightly closed and short, light green. The movement slides slowly.

Chlorophyta is the most diverse group of algae because there are single-celled, colonized, and multicellular. The color body is green because there are chlorophyll a and b, carotene, xanthophyll, where chlorophyll a is contained in large quantities. Green algae have varied sizes, shapes, and compositions. Chlorophyta was found 5 species in lentic habitats, such as a). *Oedogonium* form of filaments, the distance between the bulkheads is an empty part (transparent). The characteristic is filamentous non-branching, generally found in calm freshwater, thickness is only one cell. [11]. b) *Microspora* sp has the following description of the form of filaments, both blunt ends, light green, chloroplasts throughout the body. c) *Coleochaete* sp as follows Green cell which consists of 2 concentric layers containing chlorophyll; in the other cell there is an empty and filled cell. Based on the literature this species is green; the cell wall consists of 2 concentric layers [12]. d) *Closterium* sp as follow curved cell with a pointed tip. has a line like a bow, crescent shaped, the cells are divided into two parts but there is no narrowing of the median. it looks like a crescent moon, elongated, curved and tapered in parts having bands in several cell walls serrated and radial lamina chloroplast species. There are two chloroplasts, each located on either side of the central area. [14] (e). *Scenedesmus* sp. were nonmotile algae consisting of 4 or 8 cells arranged in a row. Some species of thorny feathers. Reproduction is carried out with non-motile spores called auto spare [11]. Most of chloropyta part phytoplankton, so it relates to nutrient utilization and sunlight radiation. Phytoplankton are living organisms that hover inside water, relatively has no motility, so its very existence influenced by water movements such as currents etc [13].

Bacillariophyta can adapt to the flow of water because of the attachment to the substrate in the form of a gelatine stalk [11]. Bacillariophyta were found 5 species in lentic habitat such as a) *Cymbella* sp. shape similar to Cornish pastry and nonmotile. It has a transparent color with a ventral margin. it has a shape like Cornish pastry with a length of 10-200 micrometers. (6). (b) *Navicula* sp. It has boat-shaped, motile, and solitary cells. The cell is rectangular, with two valves having a longitudinal raphe with a nodule in the middle. The valve surface is covered by a transverse groove crossed by an elongated slope. Two chloroplasts are present, one on each side of the raphe. (c) *Pinnularia* sp. has characteristics like coil shape with a blunt tip. At the end of the cell, there are no chloroplasts, light green. The characteristics include linear, lanceolate, or even elliptical cells (6). The poles are usually round, kaput shaped, or change rostrate (d). *Synedra* sp. has an elongated and linear is a polar valve. The colony of Synedra has
a short chain but can also be a single cell. There are a narrow pseudoraphe and smooth transverse striae. Having frustule without septa or costal.

Euglenophyta already has a nucleus and chloroplast, characteristic of Euglenophyta has one or two flagella. It causes them to be able to move actively. In lentic habitat were found 3 species such a). Euglena Based on the observations, it has a round shape, chloroplasts that fill the body, eyespots (stigma), and flagellum [14]. These species are unicellular by having eyespots. Cells are slightly transparent, uniflagelate. b). Phocus sp. with a flat round shape, tails, eyespots, grooves, light green, chloroplasts throughout the body. The characteristics are characterized by a flat, leaf-shaped structure and a rigid cytoskeleton known as a pellicle. These eukaryotes are mostly green and have a single flagellum that extends the length of the body. Morphologically very flat, stiff, leaf-shaped, and contains many small discoid chloroplasts. (c) Trachelomonas sp has a round shape, greenish-yellow pigments, and thick walls. Trachelomonas sp having cells swimming freely, solitary, covered in an envelope with a clear neck or collar around the apical pore through which a very long locomotive flagellum appears; naked cells come out of envelopes during reproduction (and at other times) but immediately remove new envelopes from species-specific shapes and sizes (round, ovoid, ellipsoid or elongated). Chlorophyta are the largest group of vegetation algae, Species of the division Chlorophyta found in several posts in the Sumber Air Jaya reservoir are Spirogyra sp., Ulothrix sp., and Closterium sp. with different characteristics of each species. [15].

4 divisions found on lentic habitat not only periphytic but also Cyanophyta, Chlorophyta, Euglenophyta. Periphytic algal community composition no responded hydrological [16]. So the existence of of microalgaes were found on lentic habitat very affect by physical factors such as temperature, pH, and light intensity. The temperature of this research has range of 25-29°C. The Optimum metabolism for most living things requires a relatively narrow temperature range. The Effect of temperature directly on microalgae is to increase chemical reactions so that the rate of photosynthesis increases with increasing temperature (from 10 ºC - 20 ºC) [17]. The pH range in the area is 6.9-7.2, so it is below the optimum parameters. It can be a limiting factor for the types of microalgae. Most aquatic creatures survive on 7.0 - 8.5 [18]. Alkaline water shows high biological productivity in lentic and lotic habitats. Light penetration is often blocked by solutes in water. [13] The main turbidity is caused by sludge and particles, which settles more easily. Grains of mud reduce the entry of sunlight into the water, thereby disrupting the process of photosynthesis. The light intensity around the water is 10 cm because the water around it experiences silting due to the deposition of organic material at the bottom of the water. In addition, a research area is a place where this sometimes results in the number of organic compounds. Low brightness values will limit sunlight penetration, so the ability of photosynthesis will decrease, and it will affect microalgae existence.

4. Conclusion
Based on the research, it can be concluded that found 4 divisions in lentic habitat Cyanophyta, Chlorophyta, Euglenophyta and Bacillariophyta. The species consists of Chlorella sp, Gloeocapsa sp, Oscillatoria sp, Scenedesmus sp, Oedogonium sp, Microspora sp, Coleochaete sp, Closterium sp, Cymbella sp, Navicula sp, Pinnularia sp, Synedra sp, Euglena sp, Phacus sp, Trachelomonas sp. The microalgae were found on lentic habitat very affect by physical factors such as temperature, pH, and light intensity.

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