Identification of lichen as An Air Quality Bio-Indicator in The Campus of The State Islamic Institute Raden Intan Lampung

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Abstract. Lichen is known as bio-indicators for air quality monitoring. The purpose of this study is to identify the diversity of lichen and response as bioindicators of air pollution. The research was conducted in August until November 2016. The research location is on the campus of the State Islamic Institute Raden Intan Lampung and on the road Soekarno Hatta, Way Dadi, Sukarame, Bandar Lampung. This research is a descriptive study transect method. Based on the research conducted, Species found in the Campus Institut Agama Islam Negeri Raden Intan Lampung totaling 16 species from 8 Family Chrysotricaceae, Graphidaceae, Lecanoraceae, Megalosporaceae, Parmeliaceae, Physiceae, Trypethelidaceae, dan Rosellaceae. The total value of diversity index is 2,61. Then in a comparison study conducted on the Road Soekarno Hatta, Way Dadi, Sukarame, Bandar Lampung totaling 16 species from 5 families, Graphidaceae, Lecanoraceae, Physiceae, Trypethelidaceae, dan Rosellaceae. The total value of diversity index is 1,98. Lichen not only serves as an indicator of air pollutants but knowing the extent of pollution of air pollutants. The worse the air quality, the level of the lower Lichen diversity.

1. Introduction
An abundance of biodiversity cannot be separated from environmental conditions that support the symbiosis between all ecosystem, one kind is Lichen. Lichen commonly known as lichens are mosses are not widely known by most people, Lichen is a combination of fungi and algae that morphology and physiology is one unit [1]. These organisms usually live as an epiphyte on the trees, on the ground, especially in the area around the North Pole, on a rock, on the beach or the mountains are high [2].

Lichen can be used as bioindicators of air pollution because it is easy to absorb the chemicals in the air and rainwater. Lichen talus does not have cuticle so that support Lichen in absorbing all the elements of the compounds in, including SO² which will thallus. The ability is the basis for monitoring the use of Lichen air pollution. Lichen is the best indicator species that chemicals from rainwater and air pollution. The existence of this capability makes the lichen as a bioindicator good to see an air condition in an area that is contaminated or otherwise [3-5].

Lichen of use as bioindicators is more efficient than using tools or machines are in operation ambient indicator require substantial costs and special handling [6-8]. Lichen Karna did not have katikula so substances and of rainwater and air pollution will be absorbed by Lichen. an area polluted the air or not, can be seen from the growth of lichen attached to tree trunks. Changes in environmental conditions due to air pollution causes inhibition of growth and fertility Lichen [9-10].

So of That, Writer Conducting Research on "Identification of Lichen as a Bioindicator Air Quality In the campus of the State Islamic Institute Raden Intan Lampung". Research Lichen as bioindicators of air pollution is still a bit to do so in this study will be studied more in depth about the morphological...
diversity of the talus, and the closure of the talus [11-13]. This research is expected to provide the morphological diversity of the talus, the closure of the talus and the absorb water Lichen on the campus of the State Islamic Institute Raden Intan Lampung, which can be used as bioindicators of air pollution.

Based on the background of the above problems, the problems in this study is limited by: species diversity are located on the campus of the State Islamic Institute Raden Intan Lampung, and diversity Lichen identified based on morphological characteristics. The formulation in this study are as follows: how lichen diversity on the campus of the State Islamic Institute RadenIntan Lampung, and how Lichen diversity as bioindicators of air quality at the Campus of the State Islamic Institute Raden Intan Lampung.

2. Research Method
The study was conducted from August to November 2016, on the campus of the State Islamic Institute RadenIntan Lampung. Making herbarium and determination conducted at the Laboratory of Biology Faculty of Tarbiyah and Teaching. This research is a descriptive study transect method [14]. Results Percentage talus closure Lichen on 6 plots in Campus and Appellant.

| Table 1 Percentage of closure talus Lichen |
|------------------------------------------|
| Plots | Research Sites | Campus | Comparison |
|-------|----------------|--------|------------|
| I     |                | 1.3    | 1.7        |
| II    |                | 1.2    | 0.3        |
| III   |                | 1.3    | 0.6        |
| IV    |                | 0.9    | 1.3        |
| V     |                | 1.3    | 1.1        |
| VI    |                | 1.5    | 0.6        |

| Table 2 The air temperature and relative humidity of air Daily |
|---------------------------------------------------------------|
| Research Sites | Campus | Campus |
|----------------|--------|--------|
| Humidity (%)    | 81.5   | 71.8   |
| Air temperature (°C) | 28.6  | 30.0   |

| Table 3 Shows the name of the type, number, and location of the discovery Lichen |
|--------------------------------------|
| Family | Species | Type | Research sites |
|--------|---------|------|----------------|
| Chrysontricae | Chrysothrixsp. | C |      |
| GraphidaceaeGrap | Fissurina sp. | C |      |
| hidaceaeGraphidac | Graphis assimilisNyl. | C |      |
| daceaeGraphidac | GraphisglaucensFee | C |      |
| eaeGraphidaceae | Graphis sp. | C |      |
| GraphidaceaeLec | Phaeographissp. | C |      |
| anoraceaeMegalo | Sarcographasp. | C |      |
| sporaceae | Lecanorahelvastizenb. | C |      |
| Parmeliacea | Sipman Parmotremaasp. | F |      |
| Palmeliacea | Parmeliassulcata | F |      |
| Physciaeae | Amandineasp. | F |      |
| Physciaeae | Dirinariaasp. | F |      |
| Physciaeae | Physciaasp. Trypetheliumsp. | F |      |
3. Results and Discussion
Number diversity index ($H'$) lichen species in the Campus State Islamic Institute Raden Intan Lampung is 2.61. Lichen Parmelia sulcata is the most predominantly found on the campus of the State Islamic Institute Raden Intan Lampung with 0.30 diversity index [15-16]. While the amount of diversity index ($H'$) lichen species in locations Appellant is 2.61. Lichen Lecanora Helva Stizenb is most predominantly found in the reference sites with 0.35 diversity index.

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![Figure 1: Parmelia sulcata Lecanora helva](image)

Including Lichen Parmelia sp foliose type or shaped like a leaf, with a greenish-white color which forms of Parmelia sp. found round like a circle, whereas when viewed from a distance will look like a leaf that has been dried up. Parmelia sp. found in damp at the time on campus State Islamic Institute Raden Intan Lampung.

Lecanora Helva Stizenb is one species of the order Lecanorales, middle dark green and sections to the side light green. Lichen is irregularly shaped, the central part of Lichen, there are pieces that stand out like a pimple and has a rough surface, habitat usually are attached to the trees. Lichen existence and its habitat among the sites influenced by environmental factors, namely: daily air temperature, and relative humidity of the air daily. The measurement results showed that at the State Islamic Institute Campus Raden Intan Lampung has a daily temperature of 28.9 °C, as well as the daily relative humidity of 81.5%. Daily temperatures in Comparative Area of 30 °C and relative humidity of 71.8% daily.
Talus crustose more resistant to environmental conditions of heat compared with the talus foliose terms of environmental factors are humidity which requires relatively lower. Air humidity is affected by sunlight, actuating the air, buttressed trees, vegetation and location of the stem. The distance between the distant trees will be more rapid evaporation of moisture so that the tree becomes low. With the presence of pollutants in the air will cause growth retardation Lichen.

5. Conclusion
It can be concluded that the research done on campus gained 8 families, 16 species are reclassified into 11 types of crustose and foliose type 5. Diversity index is the medium category, namely $H^' = 2.61$. While research on a comparison site, the family obtained 5, 8 species are classified into 7 types crustose and foliose type 1. diversity index medium category, namely $H^' = 1.98$. The worse the air quality, the lower the level of Lichen diversity. The air quality at the Campus of the State Islamic Institute RadenIntan Lampung is better than comparative study site.

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