

DISTRIBUTION PATTERN OF WILD ORCHIDS IN BATURRADEN BOTANICAL GARDEN

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Abstract

The aims of this research were to find the level of local orchid diversity, the pattern of distribution and also the effects of biotic factors on the distribution of the orchids in Baturraden Botanical Garden. The method used was identification of orchid from its morphology, at heights of 780-1000 m above sea level (asl). The level of diversity was based on the Shannon-Wiener Index and the distribution pattern based on the Morishita Index. Measurements of both edaphic and microclimatic factors were taken to find out the role of abiotic factors in the distribution of orchids in Baturraden. The edaphic factors measured were : soil texture, soil structure, CEC (cation exchange capacity), humidity, pH, N,P and K content and soil organic matter. The microclimatic factors measured were : air temperature, humidity, light intensity and wind speed.

The results showed that at the sampling location, there were 29 orchids, which consisted of 20 epiphytic orchids and 9 terrestrial orchids. The diversity index of the epiphytic orchids (2.31) was higher than that of the terrestrial orchids (1.77). All of species were found to have clustered distribution pattern. Epiphytic orchids were found at different heights, ranging from 2-8 m above ground on its host trees. Most of the orchids were found on trees such as *Schima wallichii*, *Agathis alba*, *Palaquium* sp. and *Pinus mercurii*. Height also affected orchids distribution, with the highest orchid diversity found above 850 m asl with many terrestrial orchids found at that height. The microclimatic factor most affected by height were air temperature and humidity with the lowest above 900 m asl, while the soil pH and humidity were relatively the same at different heights.

Key words: distribution pattern, wild orchid, Baturraden Botanical Garden

INTRODUCTION

Orchid is a plant species which have high levels of phenotypic diversity. Orchids which are included in the family Orchidaceae is one of the highly diverse plant family and is ten percent of all plant species in the world. Orchid plant has about 800 genera and 25,000 wild species (Aha et al., 2012) and Indonesia is one of the countries which have the most species of orchid populations. Indonesia's forests store about 5,000 species of wild orchids and many have developed specific traits to adapt to their habitat, inviting pollinator and an ability to store moisture and nutrients. Orchid is currently a fairly popular ornamental plant and has been developed to meet the needs of domestic and foreign markets. Indonesia as a country with a

variety of local orchids needs to conserve and study on the characterization of various types of local orchids and adaptation to its habitat.

Microclimate and edaphic factors or growing media influence on the growth of orchids. The result of Muhit research (2010) explained that from some of the planting medium which was tested for growth of *Phalaenopsis* (moon orchid) those were the ferns, moss, coco fiber, wood shavings, and kaliandra's litter (*Calliandra* sp.), showed that kaliandra's litter media was the best for the growth of *Phalaenopsis*, followed coco fiber media. Kaliandra's litter and coconut coir fiber media had the potential to replace fern and moss media that had been used to raise moon orchids, while wood shavings media were less well compared with other media.

Muhit research's result (2010) showed that the edaphic factor conditions for the terrestrial orchid as well as the type or condition of tree where epiphytic orchids attached, influencing the growth of orchids. Besides as a growing medium for epiphytic orchids, the type and condition of the tree, especially the canopy conditions that created the shade also affected the microclimate, which in turn affect the growth of orchids as a constituent of the lower strata vegetation. Various types of plants making up the lower strata of vegetation, greatly influenced by microclimatic conditions set up by vegetation strata on it. For example, Sulandjani, *et al* research (2005) on the Pule pandak plant (*Rauvolfia pentina* Benth) indicated that the microclimatic conditions, the intensity of light and humidity were formed by the density of vegetation strata shade on it, affected the quantity, leaf area, and dry weight of Pule pandak plant roots. Therefore, the study of wild orchid distribution pattern associated with abiotic environmental factors such edaphic and microclimatic factors were important to do. The purpose of this study was to look at the diversity of the local orchid species and their distribution patterns and also see the local environmental conditions play a role in determining the distribution pattern of orchid plants in the Baturraden Botanical Gardens.

RESEARCH METHOD

This study was the first step in the exploration of the potential of breeding and cultivation of wild orchids which their presences were identified in the Baturraden Botanical Gardens, which was expected to assist in the conservation and development of orchids in the area. The identification based on morphological characteristics was the first step to do for grouping and naming orchid accurately. The diversity of orchids that presence in the area were the result of adaptation to the environment that needed to be carried out observations of abiotic environmental factors, in this case climatic factors and edaphic.

Equipment used including equipment to do the plotting, sampling the orchids, as well as tool to measure edaphic and microclimatic factors. Equipment to perform plotting and orchids observations were bamboo, binoculars, cameras, stationery, tabulation sheet, stakes, gauge, altimeter, GPS (Global Positioning System), knife, trowel, rafia, paper labels, plastic bags, orchid identification book "Orchid of Java ". Equipment for measuring microclimatic factors were the thermometer, hygrometer and luxmeter, whereas to measure edaphic factors was soil tester.

Exploration of wild orchid plants in Baturraden Botanical Gardens conducted over two days on 15 to 16 May 2014. Sampling in this orchid plant exploration, using the transect method in the form of transect line that followed the track. Inside the transect, sampling plots were made (plot). Transects were made longways with the distance between the plot of 100 meters. The plot was made until it reaches an altitude of 1,000 m above sea level. The size of each plot was made with the size of 10x10 meters by taking into consideration trees found in the area of Baturraden Botanical including pole tree (Fachrul, 2008). The plot was made on the right and left side of the walkway in hopes of representing the entire sample in the Baturraden Botanical Gardens. Sampling locations are presented in Figure 1.