Turnitin Originality Report

Processed on: 13-Sep-2019 13:58 WIB
ID: 1171963542
Word Count: 6252
Submitted: 1

DISTRIBUTION PATTERN OF WILD ORCHIDS IN BATURRADEN BOTANICAL GARDEN By Tien Aminatun

3% match ()

Warnida Lena, ., I Made Sumertajaya, ., Bagus Sartono, .. "THE METHODS OF VERTEX DISCRIMINANT MULTICATEGORY ANALYSIS WITH BOOTSTRAP APPLICATION", Faculty of Mathematics and Sciences Yogyakarta State University

Similarity Index	Similarity by Source	
6%	Internet Sources:	4%
	Publications:	5%
	Student Papers:	5%

1% match (publications)
K Kasutjianingati, R Firgiyanto. "Characterization of Morphology from Orchid Vanda sp. as a Genetic Information Source for Preservation and Agribusiness of Orchids in Indonesia", IOP Conference Series: Earth and Environmental Science, 2018

< 1% match (student papers from 16-Jan-2018)
Submitted to UIN Sunan Gunung DJati Bandung on 2018-01-16

< 1% match (student papers from 28-Nov-2015)
Submitted to University of Southampton on 2015-11-28

< 1% match (publications)
Regan Leonardus Kaswanto. "Chapter 15 Management of Landscape Services for Improving Community Welfare in West Java, Indonesia", Springer Nature, 2017

< 1% match (Internet from 30-Oct-2018)
https://www.scribd.com/document/386855323/PROSIDING-BIOSAINS-2-pdf

< 1% match (Internet from 24-Jun-2019)
https://www.scribd.com/document/330069678/Bio-Divers-It-As

< 1% match (publications)
Sanz, A.. "Effects of suckling frequency and breed on productive performance, follicular dynamics and postpartum interval in beef cows", Animal Reproduction Science, 20031120

< 1% match (publications)
Hans Georg Krenmayr. "Hemipelagic and turbiditic mudstone facies associations in the Upper Cretaceous Gosau Group of the Northern Calcareous Alps (Austria)", Sedimentary Geology, 1996

< 1% match (student papers from 11-May-2015)
Submitted to Asian Institute of Technology on 2015-05-11

< 1% match (Internet from 24-Jan-2019)
https://text-id.123dok.com/document/yd7w6wjy-kajian-agroekologi-dan-kemelimpahan-tumbuhan-obat-herba-valeriana-javanica-l-di-kawasan-lereng-gunung-lawu.html

< 1% match (Internet from 02-Dec-2015)
http://www.umnaw.ac.id/wp-content/uploads/2014/12/kultura-desember-20141.pdf

< 1% match (publications)
Ma Jianhua, Xu Shuming, Han Jinxian, Zhu Liangi, Zhao Qingliang. "Study on north boundary of subtropical zone in Funiu Mountain according to soil geochemistry", Journal of Geographical Sciences, 2003

< 1% match (student papers from 06-Dec-2013)
Submitted to University of Salford on 2013-12-06

B -10 DISTRIBUTION PATTERN OF WILD ORCHIDS IN BATURRADEN BOTANICAL GARDEN Tien Aminatun*, Paramita C. Kuswandi*, Lili Sugiyarto* and Neni Setiana** tienaminatun@gmail.com *Lecturer of Biology Education Departement, Fac. Maths and Science,Yogyakarta State University **Undergraduate Student of Biology Fac. Maths and Science,Yogyakarta State University 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 microlimatic 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 mercusii. 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 (Rauvolvia 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 Baturaden 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. B-90 Figure 1. Sampling Location Map. In each plot sampling microclimate factors were measured, namely air temperature with a thermometer, humidity with a hygrometer, and the intensity of light with luxmeter, and also edaphic factors, namely soil moisture and pH soil with a soil tester. This was done for terrestrial orchid type, whereas for epiphytic orchids, enough with the measurement of the microclimatic factors and recorded the type of the host plant. Orchid identification based on morphological characteristics, ie plant height, stem form, rod-type, presence / absence of pseudobulb, stem colors, stem diameter,

leaf shape, leaf tip shape, leaf color, leaf edge color, surface texture of the leaves, leaf symmetry, growing points of the leaves, leaf thickness, leaf length, leaf width, and the type of host plants (for epiphytic orchids). The data were analyzed quantitatively to determine the distribution patterns, namely with Morishita Index formula, whereas to determine the level of diversity of orchids calculated using the Shannon-Wiener Index. The relationship between abiotic factors (microclimatic and edaphic) on the distribution of orchid was done descriptively. Morishita Index formula and Shannon-Wiener Index is as follows. Morishita Index (Fachrul, 2008): ∑ ² − ∑x Specificatio=n: (∑x)² − ∑x IS = Morishita deployment index N = Total sampel types ∑x = Number of individuals of a species per plot ∑x2= sum of squares of individuals of a species per plot Distribution Criteria: IS <1 = Uniform IS >1 = Clustered IS =1 = Random Shannon-Wiener Index: H′ = -∑pi lnpi Specification: H' = Shannon-Wiener diversity index pi = Number of individuals of each species divided by the number of Individuals all species Diversity Criteria (Fachrul, 2008): H' < 1 = low orchid diversity 1<H'<3 = moderate orchid diversity H'>3 = high orchid diversity RESULT AND DISCUSSION Identification of Wild Orchid Discovered At all study sites with a height of 780-1000 m asl obtained 29 orchid species with 20 species of epiphytic orchids and 9 types of terrestrial orchid (Table 1). Many plants reflecting the potential of biodiversity as well as potential germplasm in the region (Indriyanto, 2006). Table 1. Types of Wild Orchid Found in the Baturraden Botanical Garden and the description No Orchid Species Description Documentation Epiphytic Orchids 1 Flickingeria sp Flickingeria sp that has been found included in the epiphytic orchids. Sympodial growth type, has a single leaf elliptical in shape with a pointed tip shape. The leaves grow from the top of pseudobulb. The farther from the root system, the leaf is getting smaller. Pseudobulb slightly flattened, green-colored and pseudobulb is associated with rhizomes (aerial stems) which can reach a length of 10-20 cm. Flickingeria sp. grow on the trunks and branches of Puspa tree with the help of aerial stems. Flickingeria sp. has a black-colored, tree moss-plastered root 2 Podocillus sp Podocillus sp. that has been found included in the epiphytic orchids. Sympodial growth type, has a needle-shaped leaves with internode between leaves very close. Pseudobulb slightly flattened bright green-colored. The length of the stem can reach a length of 15 to 25 cm. Podocillus sp. Individual position very tightly around the base of the trunk of the Puspa tree. Podocillus sp. has a white-colored root attached to the ground at the base of the Puspa tree trunk. 3 Dendrochilum sp Dendrochilum sp that has been found included in the epiphytic orchids. Sympodial growth type.Oval-shaped pseudobulb which grow tightly pale green-colored nearly brown. Dendrochilum sp small to medium sized. Dendrochilum sp lancet-shaped leaves that grow from the top of the bulb with a length of 5-15 B-92 cm. Brownish green petiole, upright and then curved. Dendrochilum sp has a brown-colored roots attached to the Puspa plants. Growing at a height of 5-7 meters in Puspa tree. 4 Bulbophyllum angustifolium Bulbophyllum angustifolium that has been found included in the epiphytic orchids. Sympodial growth type. Heteroblastic pseudobulb, green- colored avoid. Singular leaf, oblong-shaped with acute tip. Bulbophyllum angustifolium leaves lengths are 5-10 cm growing curved downward. Its roots are white-colored and are used to attach at the Puspa tree. 5 Eria iridifolia Eria iridifolia that has been found included in the epiphytic orchids. Sympodial growth type. Linear-shaped pale green-colored pseudobulb. Singular leaf with 3-15 cm long. Eria iridifolia's leaf has oblong-shaped (oval) with acute leaf tip (pointed), duplicative,fleshless, thinner than the Bulbophyllum angustifolium leaves. One pseudobulb with another are connected with the roots. Eria iridifolia has a black-colored roots attached to the damar tree with a height of 6 meters. 6 Acriopsis sp Acriopsis sp that has been found included in the epiphytic orchids. Sympodial growth type. Circular-shaped (round) pseudobulb like onion bulbs. This pseudobulb sustains 2-5 leaves blade. Single leaf linear-shaped (straight) with acute tip (pointed) and leaves length are 3-12 cm. Acriopsis sp has

a white-colored roots which is used to attach to damar tree with a height of 2 meters. 7 Dendrobium sp Dendrobium sp that has been found included in the epiphytic orchids. Sympodial growth type (has a limited stem end). Linear-shaped pseudobulb (straight), thickening and fleshy. Oblong-shaped (oval) singular leaves with acute tip (pointed) which out of the stem segments. Dendrobium sp leaves length are 5-15 cm. Have latched root and white-colored thick aerial roots, at the end of the active part has a bright green color. Dendrobium sp attached to the Puspa tree at a height of 3 meters. 8 Apendicula sp Apendicula sp that has been found included in the epiphytic orchids. Sympodial growth type. Pseudobulb has very small size linear-shaped (straight). Stem length are 7-30 cm. Green-colored. The leaves grow intermittent eliptic- shaped (oval) with retuse tip (blunt notched slightly) and leaves 2-5 cm long. Flowers grown in plant shoots. Apendicula sp has brownish white color 9 Eria obliterata Eria obliterata that has been found included in the epiphytic orchids. Sympodial growth type. Linear-shaped (straight) pseudobulb . Fleshless singular leaf with subulate shape (needle) with acute tip (pointed) 2-20 cm long. Intermittent position leaves. Stem 10-15 cm long with each segment one leaf. Root have brownish white color that are used to attach on Puspa tree. 10 Habenaria sp Habenaria sp that has been found included in the epiphytic orchids. Sympodial growth type. Lanceolate-shaped leaf (lancet) with acute tip (pointed). Greenish yellow-colored leaf 5-15 cm long. White-colored mos-plastered roots which attached on Puspa tree. 11 Bulbophyllum sp Bulbophyllum sp that has been found included in the epiphytic orchids. Sympodial growth type. Lanceolat-shaped pseudobulb (lancet-shaped). Every one pseudobulb there is one leaf. Singular leaf curved downward, linear-shaped (straight) with pointed tip. Leaves 5-10 cm long. White- colored moss plastered roots, Bulbophyllum sp root attached to Puspa tree. 12 Ceratostylis sp 1 Cerastostylis sp 1 that has been found included in the epiphytic orchids. Sympodial growth type. Small-sized linear-shaped (straight) pseudobulb. Brown-colored stem 25-40 cm long with apparent stem sections. Subulate-shaped (needle) leaf with pointed tip, located at the end. Pale green-colored leaf 3-10 cm long. Brownish white-colored latched root attached on Puspa tree at the height of 5 meters. 13 Ceratostylis sp 2 Ceratostylis sp 2 that has been found included in the epiphytic orchids. Sympodial growth type. Small linear-shaped (straight) pseudobulb. Pale green stem 15-25 cm long. Every one pseudobulb there is one leaf. Ceratostylis sp 2 have more leaves than Cerastostylis sp 1 because it's not only grow at the tip but it also grows on each stem segment. Ceratostylis sp 2 have white-colored root attached on Puspa tree at the height of 5 meters. B-94 14 Ceratostylis subulata Ceratostylis subulata that has been found included in the epiphytic orchids. Sympodial growth type. Elongated round shaped stem with the height of 25 cm. Subulate-shaped (needle) leaf with acuminate tip (pointed with a sharp edges). Dark green-colored leaf. White-colored root and being used to attach on Puspa tree. 15 Dendrobium hymenophyllu m Dendrobium hymenophyllum that has been found included in the epiphytic orchids. Sympodial growth type. Linear-shaped (straight) pseudobulb. Reddish brown-colored stem 10-25 cm long. Lancet-shaped leaf with reddish dark green-colored pointed tip. White-colored root with many moss around itu. Latched root which is used to attach on Puspa tree at 5 meters height. 16 Pholidota ventricosa Pholidota ventricosa that has been found included in the epiphytic orchids, found on Puspa tree. Sympodial growth type. Cone- shaped pseudobulb. 6-8 cm tall plant with a strong stems and segmented. Pholidota ventricosa flower grows clustered and erected if grow wildly on a rocky places. The flower size is small but with relatively plentiful flower. 17 Bulbophyllum flavescens Bulbophyllum flavescens that has been found included in the epiphytic orchids. Sympodial growth type. Small-sized pseudobulb, javelin- shaped. It doesn't have petiole. Oblong-shaped singular leaf with acute tip (pointed). Leaf grows upward 10-25 cm long. White-colored root, attached to damar tree at 7 meters height. 18 Coelogyne speciosa Coelogyne speciosa that has been found included in the epiphytic orchids.

Sympodial growth type. Angular pseudobulb with elliptical- shaped (ellipse) that grow close to one another. Elongated lancet-shaped leaf which grow at the tip of the bulb 16 cm long. On every pseudobulb there is one leaf. The flower has greenish yellow color. The root has white color. This orchid found attached on damar tree at 2 meters height. 19 Rhododendro n sp Rhododendron sp that has been found included in the epiphytic orchids. Sympodial growth type. Lancet-shaped singular leaf with pointed tip 10- 15 cm long. Disposal is at the top position. The upper part of the flower has red color, the lower part has a tinge of yellow color. This orchid found attached on damar tree at the height of 8 meters. 20 Bulbophyllum vaginatum Bulbophyllum vaginatum that has been found included in the epiphytic orchids. Sympodial growth type. The pseudobulb is small in size and ovale-shaped (ovate), yellowish green-colored that connected with rhizome.Singular leaf, grow at the top of the bulb. Flower stalk 12 cm long. Flowering position is ath the top with yellowish white-colored flower resembling fireworks. Terrestrial Orchid 21 Plocoglottis sp Plocoglottis sp that has been found included in the terrestrial orchids. Monopodial growth type. Oblong-shaped (oval) pseudobulb with brownish pale green color. At one pseudobulb there is only one leaf. Petiole 21 cm long. Green-colored pleated leaf 15 cm long. Brownish white-colored root. 22 Goodyera sp Goodyera sp that has been found included in the terrestrial orchids. Monopodial growth type. Ovate-shaped leaf with apiculate tip (pointed tip). Leaf 7-15 cm long with 5 cm width. Color stem is green and in each stem segment emerging roots that leading to the ground. The root has light brown color. 23 Phaius callosus Phaius callosus that has been found included in the terrestrial orchids. Sympodial growth type. The pseudobulb is small linear-shaped (straight) with midrib 12 cm long, connected with a hard rhizome. The leaf is oval-shaped pleated (parallel spine leaf), bigger compared with Calanthe pulchra, 15-30 cm long and the leaf shrivel at the tip. Bright green-colored leaf. The root has brownish white color. 24 Cryptostylis sp Criptostylis sp that has been found included in the terrestrial orchids. Sympodial growth type. Linear-shaped (straight) pseudobulb. Greenish white colored stem 11-25 cm long. Singular leaf, elliptical-shaped (ovoid) with acuminate tip. The leaf curved upward 7-20 cm long. Flower bud with white color erected. Criptostilis sp root has brownish white color. 25 Malaxis sp Malaxis sp that has been found included in the terrestrial orchids. Monopodial growth type. Linear-shaped (straight) pseudobulb. White- colored stem 20 cm long. Singular leaf lancet- shaped with pointed tip. 15-20 cm long leaf and fleshless. Flowering position at the base, flower stalk 15 cm long. Brownish white-colored root. 26 Lepidogyne longifolia Lepidogyne longifolia that has been found included in the terrestrial orchids. Monopodial growth type. The stem has white color 23 cm long. Lanceolate-shaped (lancet) stem with acuminate tip. The orchid doesn't have petiole, fleshless leaf 18-25 cm long. Brownish white-B-96 colored root. 27 Goodyera rubicunda Goodyera rubicunda that has been found included in the terrestrial orchids. Monopodial growth type. Ovate-shaped leaf with apiculate tip (pointed at the end). The leaf 7-15 cm long with 5 cm width. Upper part of the leaf is hairy. Petiole 5-7 cm long. The root has light brown color. Flowering posotion at the shoot, brownish red-colored flower. 15 cm long flower stalk. 28 Calanthe pulchra Calanthe pulchra that has been found included in the terrestrial orchids. Monopodial growth type. Calanthe pulchra included on rosset plant. Linear-shaped (straight) pseudobulb which connected with petiole. The petiole has 6-20 cm length. Pleated leaf with green color, 10-35 cm long. Small flower with yellow color at the top. The root is strong for sustaining, white-colored. 29 Calanthe sp. Calanthe sp that has been found included in the terrestrial orchids. Monopodial growth type. Small linear-shaped (straight) pseudobulb. Calanthe sp is smaller if compared with Calanthe pulchra. Petiole 5-10 cm long, white- colored. Lancet-shaped dark green-colored leaf with acuminate tip (pointed with sharp edge) and pleated leaf. Leaves arch downward. White- colored root. The Level Of Diversity And Orchid Distribution Patterns According To Elevation Difference In locations with different heights indicated a

difference type of orchid plants that were found (Figure 2. Orchid Distribution Map at the Baturaden Botanical Gardens). At all study sites with a height of 780-1000 m asl obtained 29 species of orchids, comprised 20 epiphytic orchids species and 9 terrestrial orchids species. From the calculation of the Shannon-Wiener index, known that the diversity of epiphytic orchids (with an index of 2.31) was higher than terrestrial orchids (with an index of 1.77). Epiphytic orchids lived in different heights ranging from 2-8 meters above the ground on a host tree. The most widely trees that being used as hosts were Puspa (Schima wallichii), then respectively followed by Damar (Agathis alba), Perca (Palaquium sp.), and Pine (Pinus mercusii). Altitude factors affecting the orchids distribution, at the elevations above 900 m asl had the highest diversity of orchids because at the elevations above 850 m asl many terrestrial orchid began to be found. Altitude has implications for the growth of orchids. At an altitude of 1,000 m asl were found 9 species of orchid which showed that the increasing in height, the orchids were found also increasingly diverse supported with environmental factors. According to Siregar (2005), along with increasing altitude, air temperature will decrease while the intensity of light and humidity increased, this caused by the canopy is very rare so that the sunlight easily reach the forest floor without obstacle. The level of diversity of epiphytic or terrestrial orchids in the Baturaden Botanical Gardens classified as moderate, because it had the value of the Shannon- Wiener diversity index between 1-3. Diversity of epiphytic orchids higher at 2, 31 compared with the diversity of terrestrial orchid that only 1, 77 (Table 2). Epiphytic orchids lived in different heights ranging from 2-8 meters at the host tree to get sufficient sunlight. Epiphytic orchids also got a supply of organic elements that support growth so the species that being found was more than the terrestrial orchids. Terrestrial orchids got less light when the strata of vegetation canopy very dense, it could be affecting the propagation and growth. Table 2. Morishita Index Value and Diversity Index of Orchids Types in Baturraden Botanical Gardens Num Orchid Species Total of Individuals Morishita Index Distribution Types Diversity Index (H') Epiphytic Orchid 1 Flickingeria sp 109 10,11 Clustered 0,34 2 Podocillus sp 1 Clustered 0,01 3 Dendrochilum sp 21 7,2 Clustered 0,14 4 Bulbophyllum angustifolium 83 5,656 Clustered 0,31 5 Eria iridifolia 49 3,801 Clustered 0,24 6 Acriopsis sp 6 12 Clustered 0,06 7 Dendrobium sp 21 6,343 Clustered 0,14 8 Apendicula sp 30 5,793 Clustered 0,18 9 Eria obliterata 14 6,198 Clustered 0,11 10 Habenaria sp 50 12 Clustered 0,24 11 Bulbophyllum sp 14 12 Clustered 0,11 12 Ceratostylis sp 1 3 12 Clustered 0,03 13 Ceratostylis sp 2 5 12 Clustered 0,05 14 Ceratostylis subulata 30 12 Clustered 0,18 15 Dendrobium hymenophyllum 2 12 Clustered 0,02 16 Pholidota ventricosa 1 12 Clustered 0,01 17 Bulbophyllum vaginatum 1 12 Clustered 0,01 18 Bulbophyllum flavescens 2 12 Clustered 0,02 19 Coelogine speciosa 6 8 Clustered 0,06 20 Rhododendron sp 1 12 Clustered 0,01 Total : 2,31 (medium) Terrestrial Orchid 21 Calanthe pulchra 13 12 Clustered 0,32 22 Plocoglottis sp 4 12 Clustered 0,17 23 Goodyera sp 2 Clustered 0,11 24 Chalanthe sp 25 12 Clustered 0,37 25 Phaius callosus 2 12 Clustered 0,11 26 Cryptostylis sp 10 12 Clustered 0,29 27 Malaxis sp 3 12 Clustered 0,14 28 Lepidogyne longifolia 2 12 Clustered 0,11 29 Goodyera rubicunda 3 12 Clustered 0,14 Total : 1,77 (medium) B-98 Figure 2. Wild Orchid Distribution Map at the Baturraden Botanical Gardens at Various Height The calculation result using Morishita index (Table 2), orchid plants at an altitude of 780-1000 m asl all of the orchid had the clustered pattern. Clustered dispersion pattern could be caused by descendant inability to move out from the parent place, and also the environment was adequate to grow. Djufri (2002) suggested that the pattern of distribution of plant species tended to cluster, because the plants reproduced by seeds that falled close to the parent or the rhizomes that produced vegetative seedling were still close to their mother. Podocillus sp was only found at an altitude of 850 m above sea level with attached to puspa tree. Podocillus sp was able to find a suitable microhabitat on puspa tree trunk so multiply well by covering the surface of the puspa tree trunk

circumference. Additionally, Podocillus sp had adaptability at the hosts it occupied. Goodyera sp was found at an altitude of 935 m above sea level and 950 m above sea level. At an altitude of 935 m above sea level and 950 m above sea level it did not have much stand so that the light could reach the forest floor so Goodyera sp got an environment that supports its growth. Furthermore Suin (2002), described that the abiotic environmental factors determined the propagation and growth of an organism and each type could only live in certain abiotic conditions that were within a certain tolerance range that was suitable for the organism. In general, microclimatic factors in cooperate with altitude factors influencing the distribution of orchids. Microclimatic factors data are presented in Table 3. In locations with different heights indicated a difference in species of orchids found. At an altitude of 780 m above sea level only epiphytic orchids Bulbophylum angustifolium was found which epiphytes to puspa tree, lived at an altitude of 2 meters. In the measurement of light intensity reached 783x10 lux. Although the light intensity was high, epiphytic orchid was unable to capture all of the light caused by the host plant canopy covered it. The lack of vegetation trees due to illegal logging caused the orchid species found was a little in amount because there was no vegetation for the orchid to live. At an altitude of 800 meters above sea level epiphytic orchid Eria iridifolia and Coelogine speciosa were found, while the terrestrial orchid found in this location was Goodyera rubicunda. At a height of 6 meters Eria iridifolia were found to capture light which covered by damar tree canopy. It was also revealed by Yahman (2009) that if orchids attached to the shade of the tree canopy, the orchid was not going to get light, therefore the dominant epiphytic orchids attached at the top. At an altitude of 850 meters above sea Flickingeria sp, sp Podochilus sp, Dendrochilum sp, and Bulbophyllum angustifolium were found. Flickingeria sp that has been found is included in the epiphytic orchids. At this location, the air temperature was 23oC which was the optimal temperature for orchid's growth. According to Anwar et al. (1984), the physical environmental factors that affected plant development in mountainous areas were altitude, air temperature and humidity, where for every increase of 100 meters above sea level, the temperature dropped 0,6oC. At an altitude of 860 m above sea level Coelogine speciosa, Dendrocillum sp, Apendicula sp, and Rhododendron sp were found with 24,5oC air temperature. According Sessler in Solvia (2005), the temperature of the environment including the required temperature for orchids to grow which was around 22°C-34°C so that orchids were found in this location had a moderate stability. At an altitude of 870 meters above sea level on tracks one Bulbophyllum angustifolium, Eria iridifolia, and Acriopsis sp were found on 82% humidity. Orchids need high humidity so at the humidity of 82% orchids can still be alive which is shown with the discovery of four species orchids shown on this altitude. At an altitude of 870 m above sea level on track two epiphytic orchids and terrestrial orchids were not found. At this location zingiber vegetation and ferns were found while stand that were found were damar tree and rotan tree. Humidity was 95% at this location which makes the absence of living orchid plants. According solvia (2005) orchid needed moisture to grow around 75% -90%. At an altitude of 890 m above sea level epiphytic orchids and terrestrial orchids were found. Epiphytic orchids found were Bulbophyllum flavescens epiphyte on damar tree and lived at a height of 7 meters. Epiphytic orchids were found at varying heights to get sunlight because sunlight was generally covered by vegetation of trees and dense canopy, so that the orchid unabled to get direct sunlight. At an altitude of 915 m asl neither wild epiphytic nor terrestrial orchids were found. This case because at the location was an open land then used as the embroidery land. The vegetations that dominates this location were kaliandara and ferns, while the existing stand such as pine trees and damar tree. The light intensity at this location was 669 x 10 lux (high) because there were not many shading trees. So little finding of the tree used as orchid host plant was also one of the reason why epiphytic orchid could not be found. At an altitude of 953 meters above sea level found several wild orchids

such as Dendrobium sp, Calanthe pulchra, Apendicula sp, Eria iridifolia, Plocoglottis sp, Goodyera sp, Flickingeria sp, and Eria obliterata. Dendrobium sp found included in the epiphytic orchids. At an altitude of 950 m above sea level epiphytic orchids and terrestrial were found. Terrestrial orchids such as Goodyera sp, whereas for epiphytic orchids were Flickingeria sp, Dendrobium sp, Eria obliterata, and Habenaria sp. B-100 At an altitude of 970 m above sea level epiphytic and terrestrial orchids were found. Epiphytic orchids found are Eria iridifolia, Bulbophyllum sp, Flickingeria sp, Ceratostylis sp 1, Ceratostylis sp 2, Ceratostylis ubulata and Dendrobium hymenophyllum. Terrestrial orchids found at an altitude of 970 were Calanthe sp and Phaius callosus. At an altitude of 976 m above sea level epiphytic orchid such as Bulbophyllum vaginatum was found. At an altitude of 1. 000 m above sea level epiphytic and terrestrial orchids were found. Epiphytic orchids that have been found were Bulbophyllum sp, Bulbophyllum angustifolium, Eria obliterata, Appendicula sp, Pholidota ventricosa, and Flickingeria sp. Terrestrial orchids found in altitude of 1,000 m above sea level were Calanthe sp, Cryptostylis sp, Malaxis sp, and Lepidogyne longifolia. The existence of an orchid species is generally associated with environmental factors. A high level of diversity of orchids requires adequate environmental conditions for the growth of various types of orchids. The average air temperature in various locations' altitude was 23oC. According Iswanto (2002) for orchid plants to live it required a maximum temperature of about 28oC and minimum temperature of about 15oC, thus 23oC temperature providing suitable conditions for orchid plants. Altitude has implications for the growth of orchids. At an altitude of 1. 000 m above sea level 9 species of orchid were found showing that the increasing height, the orchids are found is getting more diverse with the support of the environmental factors. According to Siregar (2005), along with increasing altitude, air temperature would decrease while the intensity of light and humidity increased; this was due to the canopy had been rare so the sunlight would reach the forest floor without an obstacle. Table 3. Data of Microclimatic And Edaphic Factors on Sampling Plots Location Air Temperature (oC) Air Humidity (%) Light Intensity (lux) pH soil Soil Humidity (%) Orchid Found Track 1 Plot 1 23 86 257 x 100 6,8 64 1. Flickingeria sp 2. Podocillus sp 3. Dendrochilum sp 4. Bulbophyllum angustifolium Plot 2 23,5 82 152 x 100 6,8 62 1. Bulbophyllum angustifolium 2. Eria iridifolia 3. Acriopsis sp Plot 3 23 91 669 x 10 6,8 64 - Plot 4 22 95 176 x 1 6,8 62 1. Dendrobium sp 2. Calanthe pulchra 3. Apendicula sp 4. Eria iridifolia 5. Plocoglottis sp 6. Flickingeria sp 7. Goodyera sp 8. Eria obliterata Plot 5 22 95 256 x 1 6,8 95 1. Goodyera sp 2. Flickingeria sp 3. Dendrobium sp 4. Eria obliterata 5. Habenaria sp Plot 6 22 95 430 x 1 6,8 95 1. Eria iridifolia 2. Bulbophyllum sp 3. Flickingeria sp 4. Calanthe pulchra 5. Phaius callosus 6. Ceratostylis sp 1 7. Ceratostylis sp 2 8. Ceratostylis subulata 9. Dendrobium hymenophyllum Plot 7 22 91 576 x 10 6,8 91 1. Bulbophyllum sp 2. Bulbophyllum angustifolium 3. Calanthe pulchra 4. Eria obliterata 5. Appendicula sp 6. Pholidota ventricosa 7. Cryptostylis sp 8. Malaxis sp 9. Flickingeria sp 10. Lepidogyne longifolia Track 2 Plot 1 23 91 666 x 1 6,4 60 1. Chalanthe sp 2. Bulbophyllum flavescens 3. Goodyera rubicunda Plot 2 23 95 352 x10 6,2 60 - Plot 3 24,5 91 363 x 10 5,7 80 1. Coelogine speciosa 2. Dendrocillum sp 3. Apendicula sp 4. Eria iridifolia 5. Rhododendron sp Plot 4 23,5 86 789 x 1 5,8 60 1. Eria Iridifolia 2. Coelogine speciosa 3. Goodyera rubicund Plot 5 25,5 74 783 x 10 5,8 65 1. Bulbophylum angustifolium In addition to microclimatic factors, edaphic factors or soil also affects the distribution of plants, including orchids. From Table 3 it can be seen that orchids grow on soil pH of 6.4 to 6.8. According to Gunawan (2000), the pH ranges for orchid propagation between 4-7, so that at pH 6.4 to 6.8 orchids can grow optimally. Soil pH value affects the existence of essential nutrients that are used for the growth of terrestrial orchids. The effect of soil pH on the availability of these elements that is nutrients become available or less available which can result in deficiency or element poisoning on orchids. An area with high rainfall the soil tends more sour, while the soil in dry regions oftenly are more alkaline. Terrestrial orchids that had

been found were living in soil moisture between 60-95%. Soil moisture affects the speed of seed germination, root growth and development of food reserves storage organ in the ground thus directly contribute to the growth and development of the orchid. B-102 CONCLUSION AND SUGGESTION It could be concluded that the entire study site with a height of 780-1000 m asl obtained 29 species of orchids which consisted of 20 species of epiphytic orchids and 9 species of terrestrial orchids. Epiphytic orchid diversity index (2.31) was higher than terrestrial orchids (1.77). Of the 29 species of wild orchids found in the Baturraden Botanical Gardens based on height sampling, all had a clustered distribution pattern. Epiphytic orchids lived in different heights ranging from 2-8 meters above the ground on a host tree. Most trees that being used as hosts were Puspa (Schima wallichii), then consecutively followed by Damar (Agathis alba), Perca (Palaquium sp.), and pine (Pinus mercusii). Altitude factors were affecting the distribution of orchids, at elevations above 900 m asl had the highest diversity of orchids because at altitude above 850 m ranging terrestrial orchids were found. Microclimatic factors that appeared to have differences due to the effect of altitude were temperature and humidity, which was the lowest number in the location above 900 m asl, while the edaphic factors such as pH and soil moisture were relatively equal in various heights. REFERENCES Anwar, J., S.J. Damanik, A.J. Whitten & N. Hisyam. 1984. Ekologi Ekosistem Sumatera. Yogyakarta: Gadjah Mada University Press. Djufri. 2002. Penentuan Pola Distribusi, Asosiasi, dan Interaksi Spesies Tumbuhan Khususnya Padang Rumput di Taman Nasional Baluran Jawa Timur. Biodiversitas. 3(1): 181-188 Fachrul, M. F. 2008. Metode Sampling Bioekologi. Penerbit Bumi Aksara: Jakarta. Gunawan, Livy W. 2000. Budidaya Anggrek. Penebar Swadaya: Jakarta. Indriyanto. 2006. Ekologi Hutan. Bumi Aksara: Jakarta Iswanto, H. 2002. Petunjuk Perawatan Anggrek. Jakarta : Agromedia Pustaka Muhit, A. 2010. Teknik Penggunaan Beberapa Jenis Media Tanaman Alternatif dan Zat Pengatur Tumbuh pada Kompot Anggrek Bulan. Buletin Teknik Pertanian Vol. 15 No. 2, 2010:60-82 Siregar, K. 2005. Studi Ekotaksonomi Vegetasi Bawah pada Jalur Pendakian Gunung Sinabung Kabupaten Karo. Skripsi (tidak dipublikasikan). Medan: Fakultas MIPA Universitas Sumatera Utara. Solvia. 2005. Budidaya Anggrek. Badan penelitian dan pengembangan pertanian. Departemen Pertanian Suin, N.M. 2002. Metoda Ekologi. Cetakan ke-1, Edisi ke-2. Padang: Universitas Andalas Sulandjari, S. Pramono, S. Wisnubroto, dan D. Indradewa. 2005. Hubungan Mikroklimat dengan Pertumbuhan dan Hasil Pule Pandak (Rauvolvia serpentina Benth.). Agrosains 7 (2): 71-76 Syukur, M.S. Sujiprihati, dan R. Yunianti. 2012. Teknik Pemuliaan Tanaman. Penebar Swadaya Jakarta Yahman. 2009. Struktur dan Komposisi Tumbuhan Anggrek di Hutan Wisata Taman Eden Kabupaten Toba Samosir Provinsi Sumatera Utara. Tesis. Universitas Sumatera Utara Medan. B-104 Proceeding of International Conference On Research, Implementation And Education Of Mathematics And Sciences 2015, Yogyakarta State University, 17-19 May 2015 Tien Aminatun / Distribution Pattern Of Wild ISBN. 978-979-96880-8-8 Proceeding of International Conference On Research, Implementation And Education Of Mathematics And Sciences 2015, Yogyakarta State University, 17-19 May 2015 Tien Aminatun / Distribution Pattern Of Wild ISBN. 978-979-96880-8-8 Proceeding of International Conference On Research, Implementation And Education Of Mathematics And Sciences 2015, Yogyakarta State University, 17-19 May 2015 Tien Aminatun / Distribution Pattern Of Wild ISBN. 978-979-96880-8-8 Proceeding of International Conference On Research, Implementation And Education Of Mathematics And Sciences 2015, Yogyakarta State University, 17-19 May 2015 Tien Aminatun / Distribution Pattern Of Wild ISBN. 978-979-96880-8-8 Proceeding of International Conference On Research, Implementation And Education Of Mathematics And Sciences 2015, Yogyakarta State University, 17-19 May 2015 Tien Aminatun / Distribution Pattern

Of Wild ISBN. 978-979-96880-8-8 Proceeding of International Conference On Research, Implementation And Education Of Mathematics And Sciences 2015, Yogyakarta State University, 17-19 May 2015 Tien Aminatun / Distribution Pattern Of Wild ISBN. 978-979-96880-8-8 Proceeding of International Conference On Research, Implementation And Education Of Mathematics And Sciences 2015, Yogyakarta State University, 17-19 May 2015 Tien Aminatun / Distribution Pattern Of Wild ISBN. 978-979-96880-8-8 B-89 B-91 B-93 B-95 B-97 B-99 B-101 B-103