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PRESERVATION OF ENDANGERED ORCHID PENCIL (*Vanda hookeriana* Rchb.) FROM LAKE DUSUN BESAR NATURE RESERVE BENGKULU

Efri Roziaty
Pendidikan Biologi
FKIP, Universitas Muhammadiyah Surakarta
eroziaty@yahoo.com

Abstract-Research on the Ecological Assessment Pencil Orchid (*Vanda hookeriana* Rchb.) in Lakes Dusun Besar Nature Reserve held on February to December 2013. This study is located in the region of Nature Reserve Bengkulu. This study used purposive sampling techniques in site selection and using 2 m x 2 m plot for sampling. The results are found that orchid pencils are very rare nowadays. Orchids are found generally still yet flowering buds. In the research that has been carried out it was concluded that the *Important Value Index* (INP) of *Vanda hookeriana* is the lowest one is 19.65 % while the highest INP value is *Imperata* sp. (Graminae) 78.60 %. Besides, the population of Vanda host is the daffodil (bakung putih) also considered well too. Vanda is an epifit organism, it really need host to grow up. *Vanda hookeriana* life depends on ecological factors such as temperature, humidity, sunlight penetration and the pH of the water. The low value of INP *Vanda hookeriana* is because the flower rare. The flower is hunted by people because it is a very commercial nature orchid in the world oforchid lovers. Related to preserv of the orchidin their natural habitats, it's really need the government enforcing the new regulation about the orchid preservation. It also consider to conserve as the Vanda's host.

Keywords : *endemic orchid, Vanda hookeriana, Bengkulu Nature Reserve, endanger orchid*

INTRODUCTION

Orchids are herbaceous plants which are distinguished based on how / where the growth is epiphytic orchids and terrestrial orchids. Orchids are epiphytic orchids that live attached to other plants called the host but does not cause harm to the host organism. Meanwhile, orchids are terrestrial orchids that live in the soil. Pencil orchids belonging to the orchid epiphytic who stays in the host organism.

Diversity of species and varieties of orchids around the world is very high. Thousands of species of orchids are found in tropical forests, especially in the Indo - Malayan. Most of pristine natural form of orchids or

wild orchids that have not been touched by human technology, but in reality thousands of orchid species are currently threatened with extinction due to wild orchids pengoleksian extensively for raw materials cut flower industry, consequently the number diminished over time (Lovelles , 1998).

According Wagiman and Sitanggang (2007), the number of orchids around the world is estimated at about 25,000 species. According Gunadi (1986), in Indonesia is estimated to have about 5,000 species of orchids are scattered in the forest – forest in Sumatra, Kalimantan , Sulawesi and Papua . Particularly in Sumatra has about 1,118 species of orchids. Orchid plants have beneficial aspects not only of ecological but also economical aspects (commercial). In terms of ecological , orchids serve as a counterweight ecosystem because orchids are habitat for insects such as ants and termites . From the economic aspect , the orchid plant that pencil is a very high economic value . According to information from the people living around the area of Dusun Besar Nature Reserve Bengkulu stalk wild orchid pencil appreciated by one and a half million dollars.

According to orchid enthusiasts, an interesting characteristic of the orchid is attractive and distinctive colors are very attractive for orchid lovers. In particular orchid pencil, aside from the color of the lure, this orchid will issue a very fragrant odor when in full bloom . Until it is not surprising if the orchid is so hounded by unscrupulous irresponsible.

Some prerequisites orchid pencil one life ecologically, will also experience a loss of quality due to human activity. The decline in the quality of the prerequisites for the survival of orchid pencil will cause the decline in pencil orchid populations in the community. Nature Reserve is a nature conservation area which has a native ecosystems that are managed by the zoning system is utilized for the purpose of research, science, education and support farming and recreation. Nature conservation area itself is a region with a particular characteristic, both land and water that has the function of protection , life support systems, the preservation of plant and animal species diversity and the sustainable use of natural resources and ekositemnya.

Lake Dusun Besar Nature Reserve Bengkulu situated in the city, with a height of 0-1 m above sea level (Ludarubma, 2009). Determination of the region as a habitat conservation area because there is a pencil orchid (*Vanda hookeriana* Rchb.). That grow naturally around the Lake Danau Dendam Tak Sudah. Based on 2010 data, forest encroachment and DDB CA area use them in the form of oil palm plantations (52.97 ha/9.18 ha); mixture of agricultural land (12.6 ha/2.18%), rice (200.39 ha/34.73 %); road axis (2.2 ha/0.38 %), and encroachment (200.39 ha/34.73 %). While the nature reserve region area that is still not disturbing for only a 210 ha width /36,4 %. Until now active encroachment still continue occuring (Susanti *et al.* 2011).

Lake Dusun Besar Nature Reserve region contain endemic flora one of them are orchids species. This pencil orchids are so few that are very difficult to find in endemic areas or the natural habitat. Thus, the conservation status of these orchid categorized almost extinct. Therefore , efforts should be made to the conservation or protection of rare flora in their natural habitat (Santoso, 2008).

Research on orchid pencil as an endemic flora in Bengkulu are protected status because the current amount is very small and endangered species have been carried out. So, the researchers stated that the assessment needs to be done about the ecological aspects of orchid pencil in their natural habitat (Santoso, 2008). This study aims to determine the ecological factors influencing the survival of pencil orchid (*Vanda hookeriana*) in their natural habitat.

MATERIAL AND METHODS

Implementation research that lasted for ten months in February 2013 to December 2013 held at the Lake Dusun Besar Nature Reserve Bengkulu. The equipment used in this study is a rope, bar plots, erlenmeyer, hygrometers, diameter tape, plastic rope that had been measured in accordance extensive plot, sacchidisk, compass and camera as well as stationery. Chemicals used consumables is 40 % ethanol and formalin for preservation purposes contained plants in the plot.

Determination of the location of the samples was done by purposive sampling method is based on the existence of orchid plants that are

considered representative of the site, while for observation and collection of orchids in the community, using Squares Method. Squares method is the method used in the sampling technique to study the vegetation analysis using sample plot or plots. This method uses a non permanent plots rectangular squares or rectangles with a certain size. Based on the survey location in Lake Dusun Besar Nature Reserve Bengkulu, known as the is divided into three zones: the first zone close to the mainland with the assumption that there are many lilies as the primary host orchid pencil. And zone 2 and zone 3 is in the water bodies . In zone 1 made 1 track with the size of 2 mx 2 m (Figure1).

In zone 1 made by 1 transect made by 2 plots In zone 2 made as much with each transect 3 - 3 pieces each plot. Zone 3 made 4 transects consisted of transects 1 by 1 plot, transect 2 as much as 3 plots, transects 3 by 2 plot and transect 4 consisted of 3 plots. Between zones 1 and 2, 3 separated by a water barrier marsh (Figure 2). Sampling for physical and chemical factors include temperature, humidity, light penetration. While factors include pH measurements of water chemistry. Measurement of each - each abiotic factors will be conducted for each using a particular instrument in accordance with its function in the measurement of factors - such abiotic factors.

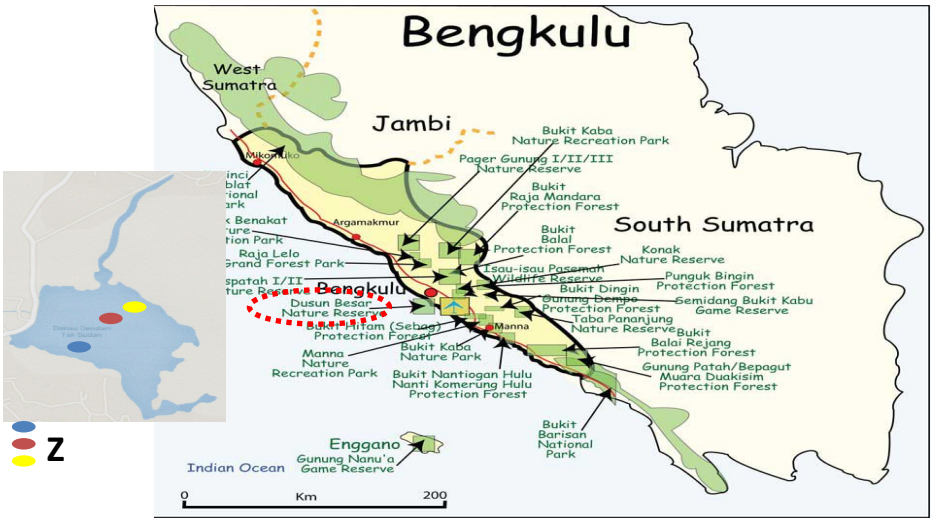

Figure 1. Lakes Dusun Besar Nature Reserve location of sampling sites were divided into two main zones, namely zone 1, zone 2 and zone 3

By analyzing vegetation and it will be known composition or composition of vegetation in the form (structure) of the vegetation communities of plants in this pencil orchid (*Vanda hookeriana* Rchb.). For purposes of analysis of vegetation data required for vegetation types present in the plot, dominance and frequency of vegetation indices to determine the importance of the constituent communities of the forest. With the analysis of vegetation can be obtained quantitative information about the structure and composition of a plant community. From the data obtained will provide information such as the composition of the vegetation in the area, suspect that there is a diversity of flora and perform correlation analysis between vegetation by environmental factors .

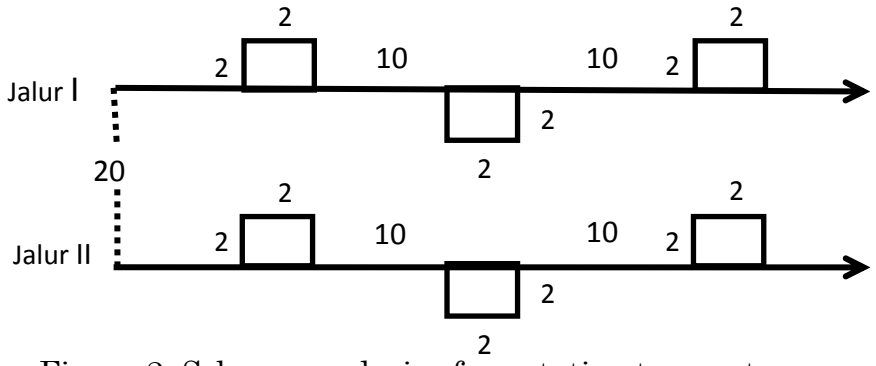

Figure 2. Scheme analysis of vegetation transects

Data analysis was performed orchid ecology quantitatively by using the equation the following equation. The data is Important Value Index (INP). The INP contains Density (K); Relative density (KR); Frequency (F); Relative frequency (FR); Important Value Index (INP) = KR + FR (Setiadi and Muhadiono, 1989).

RESULTS AND DISCUSSION

Physical and chemical factors

From the measurement results of the factor - physics and chemistry at the hamlet of Lakes Dusun Besar Nature Reserve conducted at three locations (zones) that is close to the zone and the zone of swamp land. The water temperature range is 27 - 28°C. It is possible because when the temperature measurements performed on during the day around 10:00 am. Temperature variation when shooting is not too high /different. Temperature variations and

changes that have relatively slow because the water has a large specific heat.

Table 1. Physical conditions factors of waters Lakes Dusun Besar Nature Reserve

No	Physical factors			Chemist factor
	Water temperature (°C)	Humidity (%)	Sunlight penetration (m)	pH water
1	27 – 27,5	91 - 93	1,5	5,5 - 6
2	28	93,2	1,5	6
Range	**27 – 28**	**91 – 93,2**	**1,5**	**5,5 – 6**

According to Barus (2004), the temperature fluctuations in the tropical waters generally do not change too high throughout the year so that the water temperature does not fluctuate too much . Temperature is a very important factor in regulating the whole process and the spread of the organism . In addition to the heat of the sun, other factors that affect the flow of surface water temperature is, the state of the cloud, upwelling, divergence and convergence especially around the area waters. The temperature also influenced by rainfall, air temperature, air humidity, and wind speed. The temperature of the water surface also usually follows a seasonal pattern. Changes in temperature can cause the circulation and stratification of water masses and it will affect the organisms present in the water body.

Humidity range is around 91-93 %. Air humidity value is usually opposite to the temperature value, if the temperature is high so humidity is low. If the temperature is low, the humidity will be high. According to Michael (1995), the air humidity is an important abiotic factor because it can affect the activity of the organism and may also limit its distribution in an ecosystem. Swamp is generally influenced by the wet tropical climate (Noor , 2007). In the rainy season , marsh experience filling or inundation, otherwise during the dry season water availability will decline sharply. If deterioration occurs unchecked, it will cause water shortages that will result in the survival of flora and fauna in it.

Light penetration is relatively low in the measuring range of 1.5 m, it is assumed to be due at the time of the measurement is carried out during the

rainy season. According Sastrawijaya (2000), the ability of sunlight or light penetration in water bodies depends on the content of suspended material (concentrate) in the water. In the rainy season, the suspended material carried away from the bottom waters to the surface and result in lower incoming light penetrates the water.

For the measurement of water chemistry factors, acidity of water (pH) ranged between 5.5 - 6. In marsh areas, areas with fresh water until the water quality was quite good to have a pH of about 5-7. However, because this land is the land of downstream is strongly influenced by the activities of upstream section . Various human activities are located in the upper waters will lead to declining water quality. So it would appear a lot of pollution to the water bodies (Noor, 2007).

Vegetation Analysis

Based analysis vegetation that has been done in the area of the Lake DDB Nature Reserve in the third study zone is zone 1 , zone 2 and zone 3. In one zone, located at the edge of the lake with a number invidu found only 1 individual in both plots. Total individuals are often found in zone 3 is 11 individuals (Table 2). From total 19 plots made, only 15 plots is

Table 2 . Pencil Orchid existence in each zone on the plot example

Zone	Transect	Plot	Orchids existence	Total		Keterangan
1	1	1	No	0	1	No flower
		2	exist	1		
	1	1	exist	1		
		2	exist	1		
2	2	1	exist	1	8	No flower, the stem is still small and young
		2	exist	2		
		3	exist	1		
	3	1	No	0		
		2	exist	1		
		3	exist	1		
3	1	1	exist	2	11	No flower, the stem is still young.
		2	No	0		
	2	1	exist	1		
		2	exist	1		
		3	exist	2		
	3	1	exist	3		
		2	No	0		
	4	1	exist	3		
		2	exist	1		
		3	exist	1		

Important Value Index (INP) calculation in habitat *Vanda hookeriana* the highest one is *Imperata* sp. (Graminae) 78.60 % and the lowest one is *Vanda hookeriana* (Orchidaceae) 19.65 % (Table 3) .

INP value indicates the position of the type of *Imperata* sp. (grass tribes) to other species in the swamp community in the Lakes Dusun Besar Nature reserve. These values are derived from the value of the relative density (KR) and relative frequency (FR). The greater the value of INP then we can say the greater the level of mastery of these types in the community (Setiadi, Muhadiono, Yusron 1989 ; Soerianegara and Indrwan 2005).

Characteristics of Pencil Orchids

Vanda hookeriana or pencil orchids were obtained at this research is a young plant not flowering yet. About 50-80 cm high. The color of stem is light green. The trunk diameter 0.5 - 1 cm (Appendix 1). Flower stalk will come out on the side of the trunk. In one flower stalk out about more than 5 flower buds. Flowers are arranged in a sequence that leaves out of the armpit (axillary flowers), smelled of must, the sepal colour is purple with a white background.

Vanda hookeriana is a monopodial root type. Cylindrical root, tapered tip, fleshy, soft, smooth, and easily broken. Trunk straight, sleek and not bulbous. Upright trunks and hardware. The leaves have intermittent arrangement - alternating and opposite. he leaves are green rather thick, slender elongated and somewhat stiff, about 30 cm long. Leaves rather rigid, with a flat surface, not stemmed, and sat down on the trunk. Leaf edges are flush with the ends splitting. Veins parallel to the edge of the leaf and ending at the tip of the leaf.

This plant has a root system that extends rigid cylindrical shaped pale green. Trunk, cylindrical upright with pale green leaves are 2 to 3 inches in length , or about less than 8 cm, shaped tapering to a subulate point, while the peduncle grows near the top of the stem, leaves opposite position, and bear raceme of two to five membranous flowers, each diameter measuring about 2 ½ inches or 6.35 cm, white sepals, petals increasingly large oval purple wavy magenta, and labiate extended from the base cuneate, three lobes, the upper lobe size ranging from 1 ½ inches

(3.81 cm), white, beautifully lined lengthwise in the middle, the side lobes arranged in a transverse, rich magenta purple (Williams, 1894).

Plants that grow around *Vanda hookeriana*

On this research, observation of plants which grow around the orchids are extremely done. The plants that are always present in all test plots are based on the highest number of *Imperata* sp. (Graminae) is a group of grass categorized weeds. The grass can multiply rapidly even in nutrient-poor habitats, like moist conditions, submerged or shaded.

Genus Nephrolepis is a group of ferns. This group is generally a vegetation or undergrowth that is almost always there in the forest floor area of tropical forest like Indonesia (Noor 2007). Ferns growing in a variety of habitats, including terrestrial habitats in the soil and epiphytes, either shaded or open to the light/sunlight. Epiphytes associated with mossy woods and even sometimes the rocks. These ferns are many in the swamp habitats – wetlands.

Plants are known as the host of *Vanda hookeriana* is *Crinum asiativum* or daffodil. The daffodil is a kind of herbaceous plants , annual , ± 1.3 m high. It has a pseudo stem, ± 10 cm in diameter, erect, soft, greenish white. Single leaf , lanceolate, 32-120 cm lenght, 10 cm width, thick, flat brimmed, pointed tip, base obtuse, green. Compound interest, umbrella shape, flattened stems, thick, 35-120 cm length , the base attaches crown, funnel shape, the flower is white around ± 16 cm long, purple stamens, stalk pollen 5-10 cm long, anthers color is orange, elliptical shaped ovaries ± 1.5 cm length. The fruit is oval contained 1 seed . Hard seeds, kidney shape, length ± 5 cm black. The root is like fibers, cylindrical shape, the colour is white.

CONCLUSIONS AND RECOMMENDATIONS

In the research that has been carried out it was concluded that the INP *Vanda hookeriana* is 19.65 % the lowest one while the highest one is *Imperata* sp. (Graminae) with INP value of 78.60 %. *Vanda hookeriana* depends on ecological factors such as temperature, humidity, sunlight penetration and the acidity of water (pH). The existence of thi orchid is very influenced of preservation method of *Vanda hookeriana*. It's also necessary to the preserve the daffodils as the host of pencil orchid in their natural habitat.

Some suggestions to support the preservation of the plants are : 1). conducting more and more inventory especially about orchid plants that are endemic in the nature reserve region; 2). doing domestication or cultivation *Vanda hookeriana* in new habitats because *Vanda hookeriana* has a high economical value; 3) domesticating plants until around 10 years in the future; 4) enforcing the government to preserve the sustainability of the endemic orchid through protect the orchid in their habitats.

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