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http://senjop.ppj.unp.ac.id/index.php/senjop/
Science and Environmental Journals for Postgraduate (SENJOp)
Vol.3 No.1 (pp. 21-27) December 2020
p_ISSN 2655-5085
e_ISSN 2655-5239

POPULATION OF RAFFLESIA IN MANINJAU NATURAL RESERVOIRS, NAGARI BARINGIN - PALEMBAYAN, AGAM REGENCY

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ABSTRACT

Rafflesia is one of the plants with unique properties and at the same time keeps a mystery to plants. The purpose of this study was to determine the distribution map of Rafflesia and Rafflesia individuals. The research was conducted in May 2018 in the Maninjau Nature reserve, Nagari Baringin in Palembayan, Agam Regency. The method used in this study is Purposive sampling by making a sample plot measuring 25 x 25 m in 16 plots to become 1 hectare, by measuring diameter know, scar and wart or boil and countingthe number of individuals of the Rafflesia. The results of this studyare the distribution of Rafflesia only in plot 1 and plot 2 with a population of 4 populations with the number of individuals in population 1 as many as 9 individuals, population 2 as many as 6 individuals, population 3 as many as13 individuals and in population 4 a total of 7 individuals were foundin the form of warts, knots, scars, and rotten flowers.

Keywords: *population, rafflesia, distribution, agam*

INTRODUCTION

Rafflesia flower is one of the plants with unique properties and at the same time keeps a mystery for the science of plants. Indonesia has the most Rafflesia wealth in the world, where Rafflesia is not found anywhere but can only be found in areas close to water sources from a height of 5 - 1400 m above sea level (Nais, 2001). Rafflesia plants are only in the form of buds or flowers in bloom, no stems, leaves and roots. Aside from the bud or flower. Rafflesia is only equipped with a haustorium, a network that has a root-like function that sucks in the food essence of photosynthesis from the host plant. Rafflesia is included in the group of holoparasites, plants that cannot process photosynthesis themselves, like other flowering plants, and are very dependent on the host.

The Rafflesia host is very specific to the *Tetrastigma* clan. However, not all types of *Tetrastigma* become Rafflesia hosts, and only certain species within this clan are Rafflesia hosts. The conservation status of these types of Rafflesia reflects the level of threat to the survival of a species and is also a priority indicator for conservation actions (Susatya, 2011). According to Law No. 5/1990 which states that the preservation of diversity of plants and animals and their ecosystems, carried out by maintaining the integrity of the nature reserve to remain in the original state. Rafflesia itself has been designated as a protected plant in Indonesia according to Government Regulation No. 7/1999 which explains that all species of the Rafflesia Family are protected species.

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Priatna *et al* (1989) referred to in Susatya (2011) also mentioned that Rafflesia is classified as rare and has been protected based on the Decree of the Minister of Agriculture No.6/PMP/1961/dated August 9, 1961 concerning the prohibition of releasing Rafflesia species. While the conservation status of Rafflesia. According to Nais (2001) all types of Rafflesia are said to be endangered determined based on comprehensive data of each type (List of Attachment 2). Rafflesia arnoldii (*R. Brown*) is not included in the IUCN Red List, but is considered vulnerable due to interference by tourists and collections for traditional medicines, concern is also shown by Nais (2001). However, one species of Rafflesia magnifica is listed on the IUCN Red List as highly threatened (Susatya, 2011). Distribution maps and population numbers are basic data to determine the conservation status of the species concerned and are indispensable as a basis for further research to find out unknown phenomena about Rafflesia plants. The purpose of this study is to determine the distribution map of Rafflesia, the number of populations and individuals in Maninjau Nagari Baringin Nature Reserve in Agam Regency.

METHOD

This research was conducted in May 2018 at Maninjau Nagari Baringin Nature Reserve in Palembayan, Agam Regency. Equipment tools used during this study were the Global Positioning System (GPS) Garmin 78s, ARC GIS 10.1 Software, Maps of research locations, Digital Cameras, Raphia cords, Tally sheets, Stationery, Caliper, M, Plastic Folders and Abo boards. This research was conducted with a sample plot/quadrant method that was placed Purposive Sampling. The sample plot or quadrant method will be placed in an area of 1 hectare with sample plots measuring 25 × 25 m totaling 16 plots (Nais, 2001). Purposive Sampling, i.e intentional sampling in accordance with the required sample requirements. Where researchers determine their own samples to be taken because of certain considerations. Population calculations and the number of individuals in each population are carried out by the census method (Nais, 2001). Data collection is done as follows: Conduct a survey or direct observation to the research location in the Maninjau Nature Reserve, Jorong Marambuang, Nagari Baringin, Palembayan, where the research was conducted 1) Conduct a survey or direct observation to the research location in the Maninjau Nature Reserve, Jorong Marambuang, Nagari Baringin, Palembayan, where the research was conducted; 2) Take the coordinates of the Rafflesia sp. Flower that has been found before and make the coordinates as the starting point to put a sample plot (plot) to map the Rafflesia population; 3) One sample plot measuring 25 x 25 m and 16 sample plots will be made so that the total area of observation area will be 1 hectare; 4) In each observation plot the coordinates of the presence of a supporting tree, *Tetrastigma*, flower buds that have not bloomed (knop), flowers that bloom, rotten flowers, fruit Tetrasitgmadan scar. Scar is a stomach in a *Tetrastigma* that resembles a wound (Nais, 2001), and will be collected and then made a distribution map (Nais, 2001); and 5) The number of *Tetrastigma* and Rafflesia population in each sample plot are counted and each part of the Rafflesia flower or fruit found in the sample plot will be measured in diameter.

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RESULTS AND DISCUSSION

Map of Rafflesia Population Distribution

The results of the study of the distribution of Rafflesia population in the Maninjau Nature Reserve Agam District obtained 4 populations in 2 plots measuring 25 × 25 m with a total of 16 plots which together made 1 hectare. Each liana will be equipped with fruit, stem, support tree, knob, scar, wart or boil, and flower. But in the research that has been done the researcher did not find the fruit shape that is near or around the Rafflesia flower. Map of Rafflesia Population Distribution in Fig 1 below:

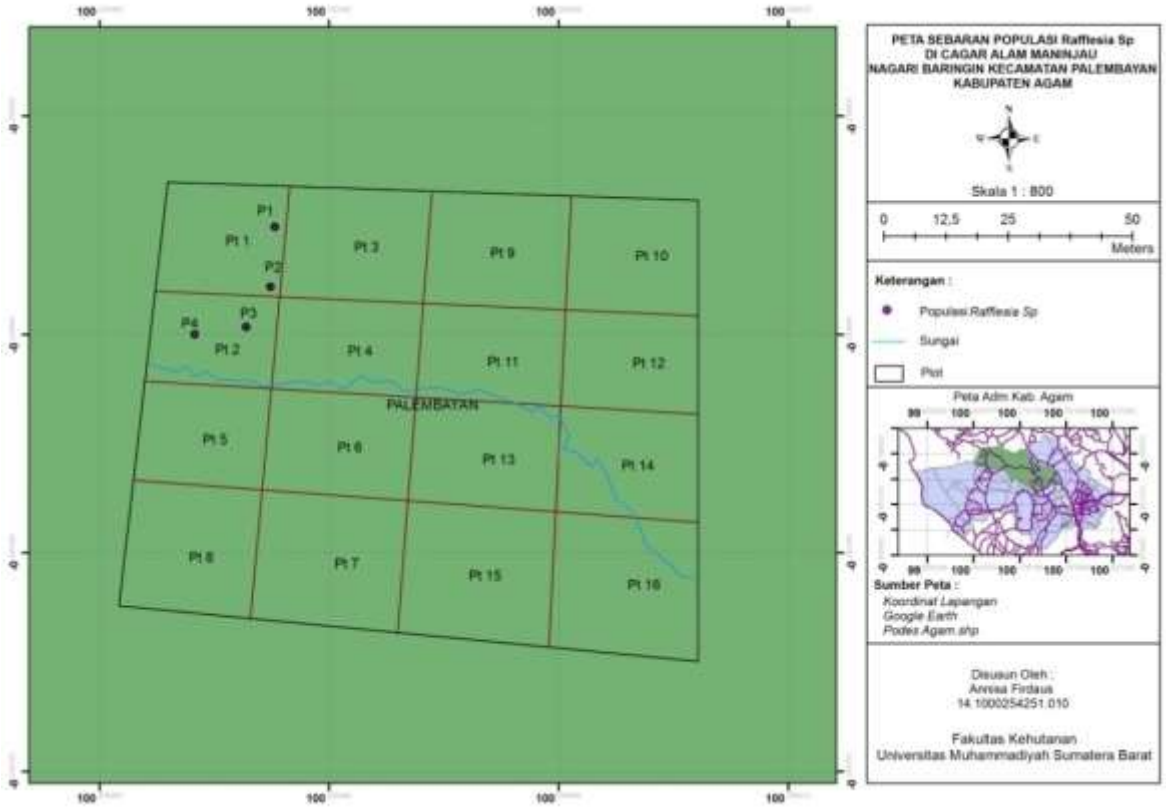

Fig 1. The rafflesia distribution

Based on Fig 1, it can be explained that the distribution of Rafflesia in plot 1 is at coordinates 00°14'26 "LS and 100°15'21.4" East with elevation of 1064 m above sea level which is found in the form of supporting trees *Tetrastigma*, knobs, scar, warts and bad rot with a slope of ± 45°and a temperature around the habitat 18°C. In population 2, the coordinates are 00°14'23.2 "latitude and 100°15'18.3" east longitude near plot 3 with a height of 1037 m above sea level, where the species found are *Tetrastigma* and knobs with ambient temperature habitat 18°C and the slope of the place ± 45°. In this population only 8 individuals were found because the existence of populations 2 and 3 are close to a distance of 1.5 m between populations 2 and 3. Therefore the host of population 2 is related to population 3 and so is the supporting tree which is also derived from population plot 2. Whereas in plot 2 there are coordinates 00°14'25.8 "latitude and 100°15'21.6" east longitude with the same height as population 2, which is 1037 m above sea level with a temperature of 18°C and a slope of ± 45°. In population 3 there are types of *Tetrastigma*, cantilever trees,

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scar, warts, rotten flowers and knobs. Then in population 4 there are also coordinates at 00°14'25.8 "latitude and 100°15'21.3" east longitude with the same height as population 2 and 3 which is 1037 m above sea level with the type of individual *Tetrastigma*, support trees, scar, wart, rotten flower and knob with a temperature of 18°C and a slope of ± 45°. For plots 3 to 8 only ordinary lianas are found which only hang as ordinary vines and not of the same *Tetrastigma* type as plots 1 and 2. The population of Rafflesisaum is generally found near water sources. The height at which Rafflesia grows varies by species, from a height of 5 m above sea level (*R. patma* in Java), to as high as 1400 m above sea level (*R. priceii*). (Nais. 2001).

Number of Rafflesia Populations

Rafflesia population in the form of shoots and knobs that will grow into a perfect flower. Following Fig. 2 population diagram and the number of Rafflesia individuals in Maninjau Nagari Baringin Nature Reserve in Palembayan, Agam Regency.

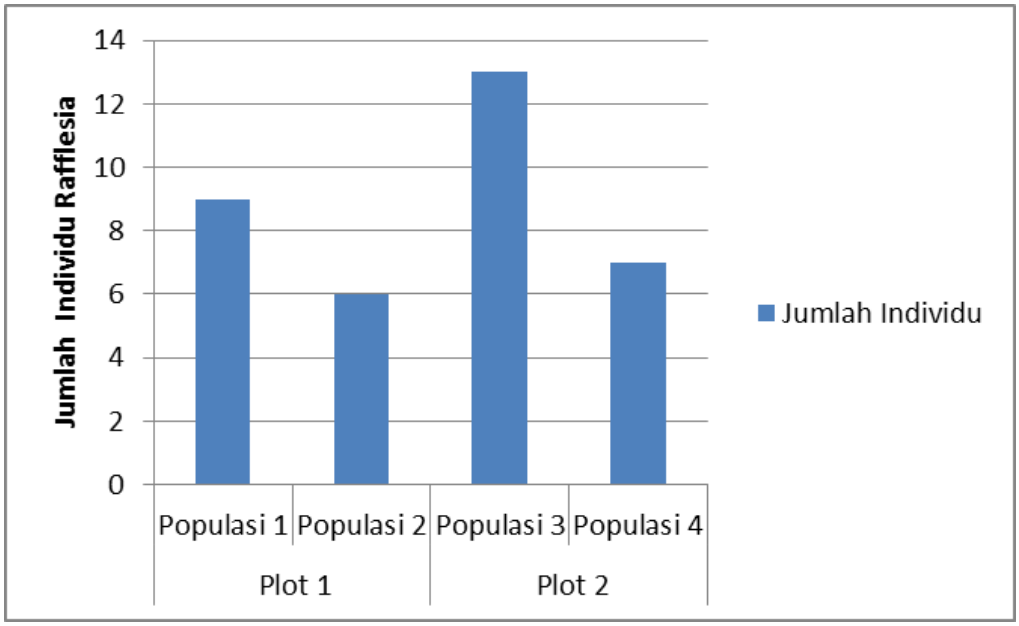

Fig 2. Diagram of population and number of individual Rafflesia

Based on the diagram in Figure 2 there are 4 populations in 2 plots where plot 1 has 2 populations and in plot 2 there are 2 populations as well. Population 1 is 9 individuals, while in population 2 there are 6 individuals, then for population 3 there are 13 individuals, and population 4 there are 7 individuals. The population referred to in the calculation of the number of Rafflesia individuals is not only the Rafflesia flower that blooms but all matters concerning how Rafflesia grows. Such as rotten flowers, blooming flowers, *Tetrastigma*, *Tetrastigma* fruit, knobs and support trees. Because Rafflesia grows, it requires a host and a supporting tree to depend on it (Nais, 2001).

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Number of Rafflesia Individuals

The number of individuals in the plot that the researcher made was found in 2 plots, with the plot distance close to the water source. Plot 1 is located at an altitude of 1064 m above sea level and plot 2 is located below plot 1 which is close to the river at an altitude of 1037 m above sea level. Plot 1 contained 2 populations where there were no blooming flowers and only 2 decomposed flowers, 2 knobs or Rafflesia buds that would bloom, 1 rotten knob, 2 scars or scars on the *Tetrastigma* stomach located close together under the decaying Rafflesia, then 1 *Tetrastigma* and 1 boil or wart on the *Tetrastigma* that will be a knob. A list of the total population of Rafflesia populations can be seen in Table 1 and Fig 3 below:

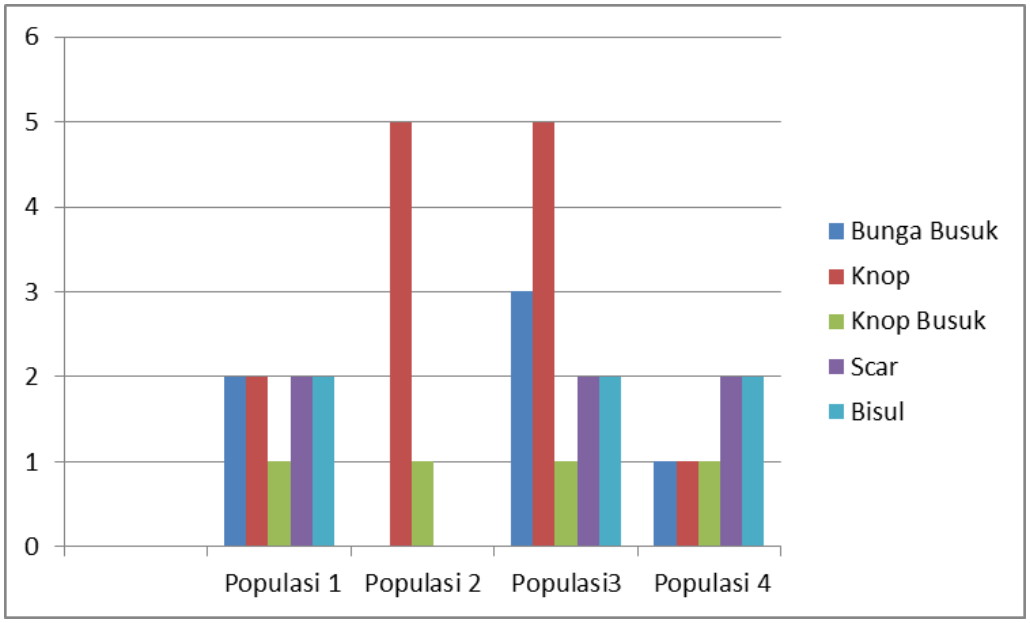

Fig 3. Diagram of the Rafflesia individual

Based on Table 1 and Fig 3 it can be explained that in population 1 only has a smaller number of individuals than population 2, where population 2 has 7 individuals while in population 3 have more individuals, i.e the number of 14 individuals in measurements that have been made on rotten knobs and knobs that are still in good condition were found that knobs will bloom in a matter of days ahead with a range of diameter sizes of 15 to 20 cm, knobs with a size of ± 20 cm will bloom within 75 to 85 days. Buds usually have a diameter of 5.7 cm and take 282 days, while a diameter of 15 cm takes 106 days to become a flower in bloom (Susatya, 2011). The following types of individuals were found in the Maninjau Nature Reserve, Nagari Baringin, Palembayan, Agam Regency:

1) Warts or Boils: Rafflesia sp flowers live on the root system or stem of the *Tetrastigma* host plant. The relationship between the parasite-host Rafflesia sp and *Tetrastigma* is very unique in the plant world. Although *Tetrastigma* is a widespread plant in Indonesia, not all hosts are overgrown with Rafflesia (Susatya, 2011).
2) Rafflesia Knob or Knob: Knop or hump or also called a bud is the formation of Rafflesia flowers. The way to predict the sex of Rafflesia shoots is to compare the height in relation to diameter. Female Rafflesia buds are slightly flatter (shorter) and wider (Nais, 2001).

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3) Scar: Scar is a stomach in a *Tetrastigma* that resembles a wound (Nais, 2001). The scars are in a part of the *Tetrastigma* which was originally a wart or boil and is infected and ruptured by Rafflesia sp which blooms right beside the wart or boil. It also causes warts to fail to bud because they are caused by animals that eat hard outer shells that resemble turtles (Carapceae) which can only be broken by animals that gnaw (Nais, 2001).
4) Rotten Flowers: Rafflesia in a state of bloom will be fully open for 4 to 8 days, but when Rafflesia starts to wilt and rot, it will start to become ripe fruit for 6-8 months. So that the spread of seeds can be perfect for 1 to 2 days, and will germinate seeds and host inoculation within 46 months (Nais, 2001). The decomposed flower forms the ripe fruit and spreads the seeds. The existence of Rafflesia fruit is characterized by perimeter conditions that rot and detach, blackening color. The whole body, especially from the bottom of the disc hardens and does not slimy as a sign of decay as well as flowers that do not develop into fruit. The older the disc, the disc starts to rise because the fruit will begin to contain. The longer the fruit is more contained, until bulging widening to the bottom. Vertical grooves that form on the surface of the fruit are shallower as the fruit ages. Over time, the processus that originally grew sticking out of the disk of the fruit was not found anymore because it fell (Mursidawati 2015).

CONCLUSION

Based on research results on Rafflesia Population in Maninjau Nagari Baringin Nature Reserve in Palembayan, Agam Regency, it can be concluded that Rafflesia Distribution in Maninjau Nagari Baringin Nature Reserve in Palembayan is only found in plots 1 and 2 which are at coordinates 00°14'26 "LS100°15 ' 21.4 "BT and 00°14'23.2" LS100°15'18.3 "East, while in plots 3 to 16 no Rafflesia or *Tetrastigma* hosts were found and only ordinary lianas hung from large trees. The population of Rafflesia contained in plots 1 and 2 consists of only 4 populations where populations 1 and 2 are in plot 1 then populations 3 and 4 are in plot 2 with elevations ranging from 1064 to 1037 m above sea level. Number of individuals in population 1 as many as 9 individuals, population 2 with 6 individuals, population 3 there are 13 individuals and population 4 there are 7 individuals. Every individual has knobs, rotten knots, rotten flowers, warts or boils and scars.

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