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Literature Review : The Distribution and Habitat Profiles of Anaphalis Spp.

Outside Protected Forest In Poncokusumo Distrit, Malang Regency

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Abstract:- The aims of the research were to Identify the species of Anaphalis found in Poncokusumo District, profiling distribution of Anaphalis in Poncokusumo Distrit, and describing habitat of Anaphalis in Poncokusumo District. The benefit of this research is the availability of baseline data as a reference for enforcement of conservation measures for Anaphalis species found in Poncokusumo. Conservation steps that can be taken include socialization of the local community, habitat protection and population monitoring. The field survey was carried out in October-December 2020 by measuring several plots in the area found by Anaphalis. Each site was analyzed for vegetation by measuring the density, frequency and cover of plants. Plant species included in the quadratic plot of 1x1 m2 were identified. In addition, microclimate factors were recorded, such as temperature, humidity and light intensity as well as altitude, coordinate points, soil type and land slope. Interviews with the local people, We interviewed informant especially was key person around we found Anaphalis habitat. We conducted a face-to-face semi-structured questionnaire and asked our informants to ask about the distribution, uses and functions, and community conservation efforts of Anaphalis. Data analysis, Vegetation analysis to know composition of plant species inside quadrates for determining diversity index, important value index, dominance and everlasting of plant. Abiotic factors that have been measured are shown in tabular form as a comparison between distribution locations. Information from interview with local person was interpreted qualitatively descriptive. Some of the conservation opportunities in the strategy are policy support for biological conservation and the ecotourism movement, threat aspects such as reduced control of land functions in mass tourism. In this study, the SWOT analysis provides recommendations on significant strategies that come from a combination of strengths and optimizing opportunities, and reducing weaknesses and optimizing opportunities so that strengths reduce threats and manage risks.

Keywords:- *Bromo, Anaphalis Spp, Distribution, Tengger*.

I. INTRODUCTION

Anaphalis (or Edelweiss, by local language) is one of the threatened plants from Asteraceae group which found in mountains area. Their native distribution was in sub-montana until alpin zone, also grows as pioneer species in volcanic soils (Hakim & Miyakawa., 2013). In East Java, especially the Tengger Mountains, there are three types of Anaphalis scattered, including A. javanica, A. longifolia, and A. viscida (Ade et al., 2019). Of the three species, A. javanica has been designated as one of the flora protected by the government through P.106 / MENLHK / SETJEN / KUM.1 / 12/2018 (KLHK, 2020), while the other two types still do not have legal status. clear. In addition, the three Anaphalis species have not been recorded in the IUCN Redlist database (Pardianti et al., 2014), so research related to the distribution of Anaphalis has an important aspect of urgency.

The distribution of Anaphalis in the Tengger Mountains has been recorded in four locations in the Bromo-Tengger-Semeru National Park conservation area (Ade et al, 2019), but the field study shows distribution found outside protected area, in highland farmlands area in Poncokusumo district. Those location still categorized as a buffer zone beyond the Bromo-Tengger-Semeru National Park. In the buffer zone, the wild of Anaphalis can easily risk to decrease by impact of human pressure and natural disaster as an effect of low protection status of the area. In some cases of human pressure, Roziaty & Wijaya (2019) shows if Anaphalis flowers are taken for drying and illegally commercialized as souvenirs and collections. In addition, Anaphalis is also potentially threatened by habitat loss due to high anthropogenic activity and natural disasters, especially fire and erosion (Pardianti et al., 2014). This condition requires an action as a solution to maintain the existence of Anaphalis. These lead Poncokusumo is a crucial area for the ex-situ conservation of Anaphalis beyond conservation area.

As far, the are no complete data related to the species diversity of Anaphalis and its distribution in Poncokusumo Villages. There is also poor information related to the habitat condition of Anaphalis. This research can also be used as baseline data to support conservartion action plans for Anaphalis.

The aims of the research were to Identify the species of Anaphalis found in Poncokusumo District, profiling distribution of Anaphalis in Poncokusumo Distrit, and describing habitat of Anaphalis in Poncokusumo District. The benefit of this research is the availability of baseline data as a reference for enforcement of conservation measures for Anaphalis species found in Poncokusumo. Conservation steps that can be taken include socialization of the local community, habitat protection and population monitoring. The Anaphalis population found can be proposed to be a special flora of the Poncokusumo area. It can be also influenced due coordinative policy for the protection of this species in the future. In addition, Anaphalis can also be proposed to be a regional tourism object of special interest by raising the use value and symbols of Anaphalis.

II. LITERATURE REVIEW

2.1 Edelweiss flower (Anaphalis spp.)

Anaphalis is a genus in the Asteraceae family. There are more than 110 species in the genus of plants that exist in Central and South Asia (Nesom, 2006) and several species that exist in North America and are very popularly cultured. There are two species, namely javanica and longifolia, which can be found in the mountains in Indonesia, especially on the island of Java. Javanica is a species that has the potential to become extinct, Anaphalis javanica, with a name more commonly known as java edelweiss or commonly called senduro, which is a flora that is in alpine or montane in the mountains (Nesom, 2006).

These plants can reach a height of 8 meters can have a stem like a large human foot, but can not be more than 1 meter for the trunk. Edelweiss is a pioneer of volcanic soil in the forest and is able to provide wealth to the soil that is barren soil that will be improved by volcanic activity. This can give the formation of mycorrhizae on fungi and soil and is not effective for area expansion by roots which can perform efficiency and to absorb higher nutrients. The flowers that exist in April and August can be very favored by more than 300 types of insects such as bees, butterflies, wasps, and bees that perch on these flowers. In this plant, if it manages to increase or maintain branch strength, it will become a nesting place for several insects such as Myophonus glaucinus.

Edelweiss flowers are too often plucked and brought down and from the mountain for aesthetic reasons for spiritual reasons, and are considered as memories for climbers. From February to October in 1988 636 were uprooted or taken from Mount Gede Pangrango and it is a place with plants which is the ultimate protection. To a certain extent the small pieces used can still be tolerated, in the Tengger Semeru National Park, this species or plant has become extinct. This has happened to be the cause of the greed of the population, especially those on small roads, this study can show that edelweiss can be propagated by cutting branches, therefore the remnants are sold to visitors to reduce pressure on the population. The best places are edelweiss in the form of Papandayan, Gde, Plawangan Sembalun, and Mandalawangi.

Anaphalis is part of the Asteraceae. Lives in the tropics which can grow up to 3,600 MDPL. This condition can survive at a fairly low nutrient content because it is combined with mycorrhizae (Van steenis, 1972). In the area of origin of Sumatra there are only two types, namely longiolia and javanica (Tjitrosoedirjo, 2000). This was done by taxonomy on Mount Talang in Sumatra and also found the same thing. In some specimens there are also deficiencies that cannot be detected in the morphology of longifolia or javanica characteristics due to natural hybrids of the two types such as internode spacing, width, growth pattern, leaf, underside, and filarial. In the distance of the internodes and the width and pattern in javanica, but on the leaves, and the color of the tip is more similar to longifolia. In comparisons or comparisons between morphologies that are often used, evidence of hybridization is found (Taufiq A, 2009, Encheva, 2005, Gong, 2008, Hamilton, 2013). From a morphological perspective, things like this hybrid show the relationship between individual characteristics but it is necessary to see some morphologies develop and evolve by convergent and environmental selection, not by hybridization (Du, Zhang, 2012). The factors that occur in the environment greatly affect the morphology, this is always correct, of course it is very difficult to know which hybrids are morphologically real. So it will be very difficult to conclude that morphological evidence can be used as reference material. Recently, anatomical methods have become the closest and most widely used method of confirming research results from natural hybrids. This is because the existing data anchor more accurate data because of the anatomical features used in the hybrids in the case of nothofagus bliqua, oerst, and galuca (Donoso, 1979).

Carrying out an approach that is quite multiple and varied in nature can increase the accuracy of the naturally occurring hybrid which is thought to be an anaphalist made by the authors. Hybrids of longifolia and javanica from Gunung Talang have been found with anatomical features of leaves and stems that are in natural hybrid status. The characteristics of the two things, especially the leaves and stems, are cross-sectional and paradermal by the method. Through this research, there are seven characteristics of natural hybrids in order to determine the layer of cells, the length of the cortex to the width of the cuku is similar to longifolioa but there is a characteristic of javanica, namely the flower layer, and the combination of the two, namely all the characteristics that support longifolia and javanica in terms of hybrids.

The diversity of life in Indonesia is also because it is the highest and most abundant in the world, this is because Indonesia is on the equator, which is used as the center of flora and fauna in the world. Anaphalis sp. Is a plant that grows in the highlands of this plant is a typical flora of the mountains. The population in Indonesia is still quite large, especially on the islands of Java and Sumatra. Anaphalis is a plant with herbaceous and woody flowers in the Asteraceae family, which is a family of the large flowered flora of Malesiana (Tjitrosoedirdjo, 2002), which is a plant with phenylal characteristics that is widespread from Europe and America. Anaphalis is a special thing, one of which is a distinctive and long-lasting smell after being picked, from the community it is used as a souvenir from the mountain (Sulistyawati et al 2017). Through patterns of anaphalic and random ecology, as well as clusters, the distribution pattern in the community refers to the condition of plants in an environment. For the pattern in distribution is very closely related to the environment. The types of organisms between places are also very related and dependent, and if a community gives a disturbance or also other environmental factors it will have an

impact on the whole community. This is evidenced in several studies conducted in several places, one of which is in North Sumatra Province, in several districts such as Samosir, Toba Samosir, and Karo with longifolia populations (Prakarsa et al 2018). Other research was also conducted in the area of Mount Papandayan, where habitat conditions are threatened. There are many people who live in the forest environment using it as one of the equipment for regional ceremonies (Pramita et al 2013).

On Mount Lawu is also one of the ones on the island of Java which is located in 3 regencies, namely Ngawi, Magetan, and Karanganyar, on this mountain there are a lot of flora and fauna, in order to reach the peak you can pass the Cemoro Sewu climb, where one of the favorite flora when climbing through this path is anaphalis which is at an altitude of 2,800 masl. This research was carried out to 1) differentiate the Anaphalis species on the Cemoro Sewu climb; 2) Studying the various distributions of Anaphalis on Mount Lawu which is on the Cemoro Sewu border in Karanganyar and Magetan districts. The process of anaphalis conservation in the Bromo Tengger Semeru National Park area really needs an understanding and deepening of the habitat of these plants. This study aims to explain the original habitat of anaphalis in the Bromo Tengger Semeru mountain area. In this study, three types of anaphalis were identified, namely javanoca, viscida, and longifolia. This species is found in climbing, shell, and ranu kumbolo. In the habitat of this research area, there are other influencing variables, namely volcanic. Anaphalis can grow on muddy, clay, dusty, and sandy plants. This plant grows by having very high competition against weeds with exotic plant species. There are several competitors in exotic plant species, namely agrotis sp., imperata, pteridium sp., Alchemilla sp., these plants play a role in being a competitor to the growth of anaphalis in their natural habitat and require massive action to minimize competing species in anphalis habitat.

2.2 Mountain Environment and Its Ecosystem

According to the World Conservation Center at the United Nations, about 23% of the world's land surface is mountainous. From altitude, it can be grouped into 3 types, namely latitude and rainfall which will affect the vegetative growth of plants, which are as follows:

1. The mountain range that extends from the lower boundary to the upper forest boundary
2. Mountains which are areas without trees and forests with a pure climate with snow; as well as
3. It is a nival area which is a snow area

Conditions at elevation and slope are natural processes of mountain ranges, but latitude and distance across the oceans are local climates that make many mountains almost rainforest, some dry, and some seasonal. Sourced from geological substrates which provide a view of the diversity of species and the influence of soil, erosion, and vegetation cover. In many mountains, natural processes such as erosion, landslides, mud, and rocks will greatly affect environmental conditions, especially for spatial areas including temporal. In this process, increasing volcanic activity will also make it the main determining actor in mountainous areas which in geology have a young age and are steep. The vegetative process of a low mountain is very possible to get similarities with the lowland areas around the area.

However, this is at an altitude of 1000 MDPL will find changes in temperature with this altitude can cause the belt to the bioclimatic is also full and given a replacement on another belt. At a certain compression of a certain area to the gradient of altitude and the diversity of plant species greatly exceeds the existing lowland types. Of course, out of 32% of the world's protected areas are mountainous areas which increasingly show the distance between all of these things. 20% of the entire population in the world also live in mountainous areas, of course, most of them live in the lowlands. There are more than ninety million people who live in areas with an altitude above 2,500 MDPL and live in poverty, which is a number with a very high vulnerability to food security. There is a lot of history in the past that tells about the growing economy of mountainous communities. However, special efforts to maintain agricultural production in locations with a fairly high altitude close to the level of the top tree line, and the economy in lowland communities gives more dominance to mountainous areas, although there are several other things such as exploitation of mountain resources that rarely occur which is very dangerous. benefit the local community.

2.3 Biodiversity Conservation

Biodiversity conservation is the protection and management of biodiversity to obtain resources for sustainable development.

Biodiversity conservation has three main objectives:

- To preserve the diversity of species.
- Sustainable utilization of species and ecosystem.
- To maintain life-supporting systems and essential ecological processes.

Biodiversity refers to the variability of life on earth. It can be conserved in the following ways:

- In-situ Conservation
- Ex-situ Conservation

In-situ Conservation

In-situ conservation of biodiversity is the conservation of species within their natural habitat. In this method, the natural ecosystem is maintained and protected.

The in-situ conservation has several advantages. Following are the important advantages of in-situ conservation:

1. It is a cost-effective and a convenient method of conserving biodiversity.
2. A large number of living organisms can be conserved simultaneously.
3. Since the organisms are in a natural ecosystem, they can evolve better and can easily adjust to different environmental conditions.

Certain protected areas where in-situ conservation takes place include national parks, wildlife sanctuaries and biosphere reserves.

National Parks

These are small reserves maintained by the government. Its boundaries are well demarcated and human activities such as grazing, forestry, habitat and cultivation are prohibited. For eg., Kanha National Park, Bandipur National Park.

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Wildlife Sanctuaries

These are the regions where only wild animals are found. Human activities such as timber harvesting, cultivation, collection of woods and other forest products are allowed here as long as they do not interfere with the conservation project. Also, tourists visit these places for recreation.

Biosphere Reserves

Biosphere reserves are multi-purpose protected areas where the wildlife, traditional lifestyle of the inhabitants and domesticated plants and animals are protected. Tourist and research activities are permitted here.

Ex-situ Conservation

Ex-situ conservation of biodiversity involves the breeding and maintenance of endangered species in artificial ecosystems such as zoos, nurseries, botanical gardens, gene banks, etc. There is less competition for food, water and space among the organisms.

Ex-situ conservation has the following advantages:

1. The animals are provided with a longer time and breeding activity.
2. The species bred in captivity can be reintroduced in the wild.
3. Genetic techniques can be used for the preservation of endangered species.

Strategies for Biodiversity Conservation

Following are the important strategies for biodiversity conservation:

1. All the varieties of food, timber plants, livestock, microbes and agricultural animals should be conserved.
2. All the economically important organisms should be identified and conserved.
3. Unique ecosystems should be preserved first.
4. The resources should be utilized efficiently.
5. Poaching and hunting of wild animals should be prevented.
6. The reserves and protected areas should be developed carefully.
7. The levels of pollutants should be reduced in the environment.
8. Deforestation should be strictly prohibited.
9. Environmental laws should be followed strictly.
10. The useful and endangered species of plants and animals should be conserved in their nature as well as artificial habitats.
11. Public awareness should be created regarding biodiversity conservation and its importance.

2.4 BIODIVERSITY MAPPING

The term 'biodiversity mapping' encompasses a variety of techniques used to represent and analyze patterns of biodiversity, and is almost always used within the framework of environmental conservation. Although maps of biodiversity can be useful simply as a way to represent complex environmental data in an easily interpretable form, usually biodiversity mapping involves further analysis and manipulation of the data in order to answer specific conservation questions. Out of necessity, some areas must be prioritized over others in terms of their conservation value. Until recently, this was done on a largely ad hoc basis with ecosystems receiving protection largely because of dramatic landscapes, recreational value, or the absence of alternative economic uses of the landscape. Over the past two decades, however, there has been a growing effort to protect important landscapes according to scientifically rigorous criteria; biodiversity mapping has been a critical tool in this effort.

Biodiversity mapping involves the cartographic representation of species distributions and/or other environmental characteristics as proxies for biodiversity. Further data, such as information on human use of the land, can also be incorporated in the analysis. These layers of data are typically entered into a geographic information system (GIS) in order to generate maps that can be used to answer the conservation questions at hand. There remain many barriers to producing useful biodiversity maps: the very notion of biodiversity is not easily quantifiable; there is a profound lack of environmental data for certain elements of ecosystems and many parts of the world, and often the quality of available data is poor. Much of the debate surrounding biodiversity mapping focuses on how to approach the problem of imperfect data and how the notion of biodiversity can best be represented. In particular, at what scale, and with what surrogate measures, can we best quantify biodiversity in ways that provide meaningful answers to conservation questions?

III. METHODS OF RESEARCH

3.1 Study Area

This study area located in Poncokusumo District, Malang Regency. Poncokusumo is one of the buffer zones on the west side of Bromo Tengger Semeru National Park (BTSNP) with a landscape including settlements, agricultural land, and production forests. Determination of the research site is done by selecting a possible location for Anapahalis to grow outside protected area because the habitat is likely to experience degradation due to human modification.

Figure 1. Maps of study area and habitat of Anaphalis.

Based on the results of the preliminary survey, the distribution of Anaphalis was found in 3 villages, namely Wringinom (Kunci), Poncokusumo, and Sumberejo (Jajang). The characteristics of the Anaphalis habitat are sloping land with dominant grassy vegetation with rocks that have some of soil as a substrate found in Poncokusumo sub-district can be found on slopes under bamboo (Kunci), around pine forests

(Poncokusumo 1, Poncokusumo 2 & Jajang 2) and around agricultural land (Jajang 1).

3.2 Field survey

The field survey was carried out in October-December 2020 by measuring several plots in the area found by Anaphalis. Each site was analyzed for vegetation by measuring the density, frequency and cover of plants. Plant species included in the quadratic plot of 1x1 m2 were identified. In addition, microclimate factors were recorded, such as temperature, humidity and light intensity as well as altitude, coordinate points, soil type and land slope.

3.3 Interviews with the local people

We interviewed informant especially was key person around we found Anaphalis habitat. We conducted a face-to-face semi-structured questionnaire and asked our informants to ask about the distribution, uses and functions, and community conservation efforts of Anaphalis.

3.4 Data analysis

Vegetation analysis to know composition of plant species inside quadrates for determining diversity index, important value index, dominance and everlasting of plant. Abiotic factors that have been measured are shown in tabular form as a comparison between distribution locations. Information from interview with local person was interpreted qualitatively descriptive.

IV. RESULTS AND DISCUSSION

4.1 Habitat Anaphalis spp. In Tourism Area in Bromo Tengger Semeru National Park, East Java

Referring to research (Hamzah, 2010) conservation of Anaphalis in the Bromo Tengger Semeru national area requires knowledge of the habitat. This study aims to describe the profile of the condition of Anaphalis spp in the area. This study also confirmed that there were three species that had been identified, namely javanica, longifolia, and viscida. This species is found on the ascent of Mount Batok and Ranu Kumbolo. This is certainly strongly influenced by volcanic activity. This plant can thrive in areas with high competition specifications for nutrients with weeds and other exotic plants.

4.2 There is a sale and purchase of Anaphalis Javanica flowers at Mount Bromo Tengger Semeru Tourism

The research conducted by (Ade et al., 2019) shows the results that the buying and selling actions carried out by descriptive analysis and inductive thinking patterns cause damage. environment because Edelweiss is a pioneer plant and a growing medium for plants and soil fertility. In addition, the impact of natural or environmental damage caused will take many victims, both in the form of property and lives caused by erosion and landslides. So, buying and selling Edelweiss flowers is not allowed in Islam based on an analysis of maslahah and mafsadah in order to take advantage and reject damage or harm. Thus, trading Edelweiss flowers does not have. The problem in particular, but has a large mafsadah or madarat, is the destruction of the mountain ecosystem. So it is logically said that, all forms of exploitation of the Edelweiss plant are a form of mafsadah that must be rejected and are not in line with the goals of shara'. Furthermore, Edelweiss flowers can be used by making them as research material, developing cultivation or even being used as medicine if it is really needed. In line with the conclusions above, the Ministry of Forestry of the Bromo Tengger Semeru National Park Center of Malang Regency, the East Java Provincial Forestry Service, the East Java Provincial Environment Agency, and other stakeholders should reinforce the applicable laws and regulations so that perpetrators of biodiversity crimes can be minimized. Sellers, buyers, and visitors to the Bromo tourist area should be smarter and more careful in utilizing the biodiversity that exists inside and outside the Mount Bromo tourism conservation area. In order to preserve biodiversity, especially plants that are protected or not protected, we should not take, pick, bring home, or trade anything that is inside or outside the conservation area.

4.3 Morphological Study of Anaphalis Javanica at Several Altitudes

In a study conducted by (Maulidan, 2015) This study was compiled using a completely randomized design (CRD) One way Anava, by observing the differences in morphology and anatomy of the leaves of Javanese Edelweiss (Anaphalis javanica) namely leaf length and width, stomata density, stomata index, stomata length and width. Sampling was taken at two different places, namely Mount Batok and Resort Cemoro Lawang. This research was conducted in April – September 2010, located in the Bromo Tengger Semeru National Park Area and the Optical Laboratory of the Islamic University (UIN) Maliki Malang. The data analysis technique used One way Anava analysis and if the treatment had a significant effect, then continued with the BNT test with a significance level of 0.05.

The results showed that there were differences in leaf morphology and leaf anatomy of Javanese Edelweiss (Anaphalis javanica) at each station with different heights, namely leaf length and width, stomata density, stomata index, stomata length, and stomata width. At Gunung Batok the stomata density is low followed by large stomata size, while at Cemoro Lawang Resort the stomata density is denser and followed by smaller stomata sizes.

4.4 Anaphalis spp. Conservation Strategy At Bromo Tengger Semeru

Several previous studies and analysis of several literatures, such as research (Ade, 2021) showed that one of the factors that can be used for conservation strategies is internal factors such as the presence of species and the value of Anaphalis spp., and the weakness is the high increase in habitat degradation in tourism.

Some of the conservation opportunities in the strategy are policy support for biological conservation and the ecotourism movement, threat aspects such as reduced control of land functions in mass tourism. In this study, the SWOT analysis provides recommendations on significant strategies that come from a combination of strengths and optimizing opportunities, and reducing weaknesses and optimizing opportunities so that strengths reduce threats and manage risks.

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V. CONCLUSSION

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