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The Distribution And Habitat Profiles Of *Anaphalis* Spp. Outside Protected Forest In Poncokusumo District, Malang Regency

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Abstract

The study's objectives were to identify Anaphalis species found in Poncokusumo District, profile Anaphalis distribution in Poncokusumo District, and describe Anaphalis habitat in Poncokusumo District. The availability of baseline data as a reference for enforcement of conservation measures for Anaphalis species present in Poncokusumo is an advantage of this study. Socialization of the local community, habitat protection, and population monitoring are all conservation measures that can be performed. Several plots in the Anaphalis area were measured during the field study, which took place in October-December 2020. The density, frequency, and cover of plants at each location were measured. A quadratic plot of 1x1 m2 was used to identify the plant species. Temperature, humidity, and light intensity, as well as height, coordinate points, soil type, and land slope, were all recorded as microclimate parameters. In-depth interviews with locals, We spoke with an informant who was a significant figure in the Anaphalis habitat discovery. We requested our informants to fill out a face-to-face semistructured questionnaire about Anaphalis distribution, uses, and functions, as well as community conservation activities. Data analysis and vegetation analysis are used to determine the composition of plant species within quadrates in order to calculate the diversity index, important value index, dominance, and plant longevity. Abiotic factors that have been measured are compared between distribution locations in tabular form. The qualitative descriptive interpretation of the information obtained from the interview with a local person was used.Policy support for biological conservation and the ecotourism movement are examples of conservation opportunities in the strategy, as are threats such as diminished control of land functions in mass tourism. The SWOT analysis in this study provides advice on important strategies based on a mix of strengths and opportunities, as well as minimizing weaknesses and maximizing opportunities, such that strengths reduce threats and manage risks.

Keywords: Poncokusumo, *Anaphalis* sp., distribution, conservation.

INTRODUCTION

Anaphalis which is often referred to as Edelweiss is a plant originating from the Asteraceae group which is found in mountainous areas. The original distribution of Anaphalis is in the submontane to the alpine zone and grows in volcanic areas (Hakim & Miyakawa., 2013). Anaphalis is also spread in the Tengger Mountains. In this area, several types of Anaphalis were found, namely Viscida, Longifolia, and Javanica (Ade et al., 2019). One of these three scattered species, A. javanica is designated as a protected flora by the government based on P.106 /MENLHK /SETJEN /KUM.1 /12/2018 (KLHK, 2020). It should be noted, however, that other species are still illegal. Furthermore, these three types of Anaphalis are The IUCN Redlist database has not been registered (Pardianti et al., 2014). As a result, understanding Anaphalis is important.

Anaphalis is found in four areas in the Tengger Mountains, specifically in the protected area. (Ade et al, 2019). Anaphalis, however, is found outside of protected forest areas, specifically in the agricultural highlands of Poncokusumo, according to research and field studies. This area has a category that is located outside of the conservation area in the buffer zone. Meanwhile, if Anaphalis is located in a buffer zone, it will be extremely vulnerable to human pressure and natural disasters due to the area's poor environmental condition.

In some cases, human pressure puts Anaphalis at risk of extinction as a result of human activities that dry and illegally commercialize Anaphalis as souvenirs and collectibles. Furthermore, Anaphalis is vulnerable to habitat loss as a result of increased anthropogenic activity (Pardianti et al., 2014). This situation necessitates a solution that will allow Anaphalis to continue to exist. Poncokusumo, in retrospect, is an important area for Anaphalis ex-situ conservation outside the conservation area.

The distribution of edelweiss outside the protected area system is critical for population protection measures. The presence of Anaphalis outside of protected areas allows rural communities to participate in Anaphalis conservation. With farmers' active participation, the edelweiss population in agricultural land presents opportunities for edelweiss cultivation. Some critical data and information, however, must be completed. Nothing is known about the variety of edelweiss species found outside of protected woods, particularly in the Poncokusumo District, as of yet. Anaphalis's regional distribution is crucial for future spatial management and wild population protection. Another component of the Anaphalis conservation plan is the high quality of habitat that is not available outside of the forest protection area. This research will be used to guide Anaphalis conservation efforts in Indonesia.

The researchers hope that by conducting this study, they will be able to collect baseline data that will serve as a guide for implementing conservation measures for Anaphalis in Poncokusumo. Conservation activities that can be carried out include outreach to the local community, habitat protection, and Anaphalis population monitoring. Anaphalis should be designated as a specific protected flora outside of the Poncokusumo area. As a result, future generations will be protected from anaphalis. Another possibility is to promote Anaphalis as a one-of-a-kind tourist destination.

MATERIAL AND METHOD STUDY AREA

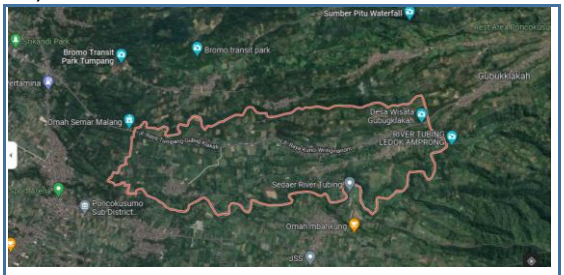
This research was conducted in the Poncokusumo district of Malang Regency. Poncokusumo is a buffer zone located west of Bromo Tengger Semeru National Park (TNBTS). TNBTS includes residential housing, agricultural land, and producing forest. Researchers chose Anaphalis as a suitable research location outside of the protected area. This is due to the possibility that Anaphalis will worsen as a result of human intervention.

According to a survey, anaphalis can be found in three settlements : Wringinom (Kunci), Poncokusumo, and Sumberejo (Jajang). This Anaphalis grows on sloping slopes with grass as the primary vegetation and rocks and soil as secondary vegetation. The majority of this land is located in the bamboo (key) area, around pine forests, and on agricultural land in the Poncokusumo area.

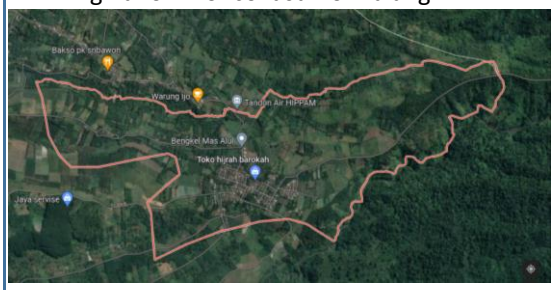
FIELD SURVEY

Researchers conducted a field survey between October and December 2020. Various plots in the Anaphalis-infested area were

measured for this study Wringinanom village (Figure 1A) and Jajang village (Figure 1B). Each area's density, frequency, and plant cover will be measured. The researcher will then identify the vegetation in the 1x1 m2 square patch (Figure 1E).



A. Wringinanom Poncokusumo Malang



D. Jajang Poncokusumo Malang

C. *Anaphilasis sp.*

Figure 1 (A) Map of the study area *Anaphalis* sp. habitat at Wringinanom village Poncokusumo Malang, (B) Map of the study area and *Anaphalis sp*. habitat at Jajang village Poncokusumo Malang, and (C) *Anaphilasis* sp.

Furthermore,any influencing parameters, such as microclimate (temperature, humidity, sunshine intensity, land height, coordinate points, and land slope to soil type), will be recorded.

INTERVIEWS WITH LOCALS

Interviews were conducted with informants, particularly significant people who live near the Anaphalis discovery habitat. Researchers developed a face-to-face semi-structured questionnaire that asked questions about the spread of Anaphalis, its uses and functions in the surrounding community, and what the community did to help maintain Anaphalis.

DATA ANALYSIS

Researchers conduct vegetation analysis as part of their data analysis. This analysis is used to determine the composition of the various types of vegetation in the square, allowing for the calculation of the diversity index, importance index, dominance, and even plant distribution. In this project, data gathered through interviews with local populations will be evaluated in a qualitative descriptive manner.

RESULT AND DISCUSSION

IDENTIFICATION OF ANAPHALIS SPECIES AND ABOVE GROUND PLANTS FOUND IN PONCOKUSUMO DISTRICT.

Anaphalis Javanica and Anaphalis longifolia can both be found in Poncokusumo Village. Anaphalis of this type grows in the same places as other Anaphalis species: in the open, abandoned areas, or barren soil.

Table 1 Identification of Anaphalis found in Poncokusumo. District

No	Family	Genus	Species
1	Asteraceae	Anaphalis	*Anaphalis javanica*
2	Asteraceae	Anaphalis	*Anaphalis Longifolia*

Source : Dewantara et al., 2017.

Anaphalis javanica (Figure 2) is a critically endangered species. *Anaphalis javanica*, also known as Javanese edelweiss (Java edelweiss) or Senduro Flower, is an endemic plant that grows in the montane or alpine zone of Indonesia's mountains. This vegetation can grow to a height of 8 meters. The trunk of the body can reach human feet, but not more than one meter. This plant is currently classified as rare because it lives in volcanic soil and can survive in barren soils by forming mycorrhizae with certain soil fungi, which are effective in expanding the area overgrown with roots and increasing efficiency in finding nutrients. (Dewantara et al., 2017).

Figure 2. *Anaphalis Javanica* (Kuswanto et al., 2021).

The Javanese edelweiss (Figure 2) is a hardy pioneer plant that has begun to colonize burned-out slopes. Javanese edelweiss can grow in open and hot environments such as craters and peaks, but it cannot compete for growth in dark and humid forests. Javanese edelweiss is a pioneer vegetation that lives in volcanic areas and can survive in barren soils. Javanese edelweiss is not tolerant and can survive in nutrient-poor soils because it can effectively form mycorrhizae with certain soil fungi. This is a flowering plant of the Asteraceae family that grows in the mountains. This type, like other Anaphalis characteristics, has flowers that are durable and not easily damaged. A tight arrangement of flowers creates a lot of compound interest. Brownish white flowers adorn the flower crown.

Javanese edelweiss (*A. javanica*) roots have single roots with fibers in root branching. The edelweiss (*A. javanica*) stem is shaped like a shrub or shrub that stores carbohydrates in the form of polyfructosan inulin and has long, thin, and hairy leaves. The edelweiss leaves are dispersed, with single leaves and flat-leaf edges. The Edelweiss has an orange center and flower heads that resemble daisies. Edelweiss flowers can live for more than 100 years, which is why they are known as perennial flowers. This species is a strong pioneer plant that has begun to colonize the barren slopes as a result of fire. (Morfometry et al., 2013). Edelweiss thrives in hot, open areas on mountain tops, where it cannot compete for growth with dark, humid forests. The classification of *A. javanica* is shown in table 2.

Table 2. Taxonomy of *Anaphalis javanica.*

Kingdom	**Plntae**
Division	Magnoliophyta
Class	Magnoliopsida
Order	Asterales
Family	Asteraceae
Genus	Anaphalis
Species	*Anaphalis javanica*

Source : Prakasa et al., 2018.

Edelweiss has a lot of environmental advantages. Insects belonging to the orders Hemiptera, Thysanoptera, Lepidoptera, Diptera, and Hymenoptera feed on the flowers. Edelweiss stems have rough, fissured bark and a lot of water, so they can be a home for a variety of mosses and lichens, including *Cladonia calycantha*, *Cetraria sanguenea*, and others. Edelweiss roots grow on the soil's surface and serve as a home for fungi that form mycorrhizae. Fungi receive oxygen and a home, whereas edelweiss receives nutrients from fungi (Prakasa et al., 2018).

Figure 3. *Anaphalis Longifolia* (Edi et al., 2020).

Long capo leaves are the name given to Anaphalis longifolia (Figure 3) by the Indonesians. Anaphalis longifolia has habitat characteristics such as an altitude of 1000-2000 mdpl, rainfall of 1500-2500 mm/year, occupying three types of land cover (industrial forest plantations, open land, and dryland agriculture), three types of soil (humus cambisol, orthic acrisol, and orthic podzols), being found on slopes greater than 60, and being found in three critical land conditions (critical, moderately critical, and very critical). *Anaphalis longifolia* is found in a small area. *Anaphalis longifolia* is a plant with the highest plant use-value in the Malang district's traditional activities of the Tengger people. When compared to *Anaphalis javanica*, *Anaphalis longifolia* has a lower economic value. (Morfometry et al., 2013).

The classification of *Anaphalis longifolia* is shown in table 3.

Table 3. Taxonomy of *Anaphalis Longifolia.*

Kingdom	Plntae
Division	Magnoliophyta
Class	Magnoliopsida
Order	Asterales
Family	Asteraceae
Genus	Anaphalis
Species	*Anaphalis Longifolia*

Source : Edi et al., 2020.

Aside from the two types of Anaphalis discovered by researchers, Poncokusumo Village is home to a number of other plant species. The following are some of the plant species mentioned in table 5 (ATTACHEMENT).

Several plants coexist with Anaphalis in Poncokusumo village, including napie grass or elephant grass, Mountain Bladderfern, and Elephant Grass, a tall grass discovered in Africa in 1913. Elephant Grass can grow up to 10 feet tall. Elephant grass grows naturally around lakes and rivers in Africa because the surrounding soil is nutrient-rich. This plant is used as animal feed in Africa. This plant has rough stems and fur that is about an inch thick at the base. It has 2 to 3 foot long leaves that are pointed at the ends and have sharp, razor-like leaf edges. This causes Elephant Grass to have strong self-defense, making it difficult to penetrate, and many bird species build nests around it. (Dumadi *et al.,* 2021).

PROFILING DISTRIBUTION OF *ANAPHALIS* IN PONCOKUSUMO DISTRICT

The distribution profile of Anaphalis in Poncokusumo Regency is classified into three categories in this study, based on diversity value and important index value.

DIVERSITY INDEX VALUE OF *ANAPHALIS* sp.

A plant community's high and low diversity indexes are determined by the number of species and the number of individuals in each species, as indicated by H. The H values for each plot are shown in the table 4.

Table 4. Diversity Index Value of *Anaphalis* sp.

No	Plot	HI
1	Plot 1	1,61
2	Plot 2	1,16
3	Plot 3	1,31
4	Plot 4	0,86
5	Plot 5	1,32

According to table 4. Each plot's diversity index value was used to generate the data. The plot with the highest diversity index value is plot 1, with a value of 1.63, and the plot with the lowest diversity index value is plot 4, with a value of 0.86. Plot 1 yielded an HI value of 1.63. Based on the existing diversity index category in plot 1 with such a H value, the result is 1 H 3, indicating that the vegetation diversity index in plot 1 is moderate.

Plot 2 yielded a H value of 1.16. The vegetation diversity index in plot 2 in the area is classified as moderate based on the existing diversity index categories, namely the value of H 1 H 3. Furthermore, the Anaphalis diversity index in plot no.3 was still higher than in plot no.2. Plot 3 yielded a H value of 1.31. According to the existing diversity index categories, the value of H1<H3 indicates that the index of vegetation diversity in the area is moderate.

Plot 4 had the lowest diversity index of all plots in this study. Plot 4 yielded a H value of 0.86. According to the existing diversity index category, a value of H1 indicates that the vegetation diversity index in the area is low. This means that *Anaphalis* sp. in plot 4 has a poor ability to maintain stability and protect itself from environmental interference. Plot 5 is the final diversity index, with a diversity index value of 1.32. According to the existing diversity index categories, the value of H 1 H 3 indicates that the index of vegetation diversity in the area is moderate.

The average diversity index value in the five plots was H1<H3, indicating that the vegetation diversity index in the area was classified as moderate based on the existing diversity index categories. This means that *Anaphalis* sp. has a fairly good ability to maintain stability despite disturbances in its components. Anaphalis, for example, can survive in nutrient-poor media due to its symbiotic relationship with mycorrhizae, which are fungi found in the roots that fix nitrogen and decompose organic matter.

IMPORTANT VALUE INDEX OF *ANAPHALIS* sp.

Following that is the Anaphalis spp. important value index. The important value index is a value index that describes the importance of vegetation in its ecosystem. If the IVI value is high, the species will have a significant impact on the ecosystem's stability. Table 6 displays the

following Important Values Index (IVI) for each plot (ATTACHEMANT).

Plot 4 has the highest Important value index (108.89) of all the plots. Meanwhile, plot number 1 has the lowest important value index (48.3) of the five plots that have been measured.

The IVI Anaphalis value obtained in plot 2 is 61.64. Anaphalis has the highest value index among the eight nearby plant species in plot 2. This demonstrates that Anaphalis is the dominant vegetation constituent in plot 2. Furthermore, the important value index of Anaphalis is still higher in plot 3 than in plots 1 and 2. The IVI value obtained in plot 3 is 81.32. Anaphalis has the highest important index value in this plot when compared to other nearby vegetation species. This data demonstrates that Anaphalis plays an important role in his community. Overall, the data obtained if Anaphalis has a higher important index value than other types of plants. This demonstrates that the greater the value of the important Anaphalis index, the greater the Anaphalis's mastery of the environment.

Plot 4 has the highest important index value of all plots in this study. Plot 4 yielded an IVI value of 108.89. Anaphalis has a significant index value in this plot, which is much higher than the other vegetation in plot 4. This demonstrates that Anaphalis is the dominant vegetation and plays an important role in its community. In plot 5, the last significant value index is 80.95. In this final plot, Anaphalis has the highest important index value among the other vegetation in the area. In other words, Anaphalis has a significant impact on the ecosystem's stability.

The diversity index values in the five plots dominated each vegetation in their respective plots, based on the existing categories of important index values. Anaphalis is the dominant and most influential plant species in the plot, according to these findings. Furthermore, Anaphalis has good adaptability in its habitat and a high tolerance value to its environment, having the highest important index value compared to other surrounding vegetation.

DESCRIPTION OF ANAPHALIS HABITAT IN PONCOKUSUMO DISTRICT

Plot 4 has the highest significance index (IVI) for the Anaphalis species, which is 108.89, while Plot 1 has the lowest significant value index (IVI) for the Anaphalis species, which is 48.3. An Important Value Index can be created by combining relative density and relative frequency (INP). IVI can be used to describe the dominance or dominance of vegetation in a given location. Those species that can adapt to their surroundings are the most important. For the existing environmental factors, each plant has a minimum, maximum, and optimum condition. The fact that this species dominates implies that there is a wider limit compared to other types of environmental factors, so the wide tolerance range causes this species to have a broad range.

There are several factors that influence the existence of species, the most important of which is competition between plants related to climate and minerals required. If these two conditions are met, this species will be found more frequently. This occurs because each vegetation has a habitat that is appropriate for its needs. If there is a disturbance in the habitat, it will affect the habitat and cause some changes in the components of the habitat. This will jeopardize the survival of the creatures that inhabit it because the habitat also contains the minimum and maximum points required by living things to survive. However, if this change occurs over a long period of time or gradually, some living things will be able to adapt and survive.

The Diversity Index is a component of vegetation that can be used to compare various vegetation communities, particularly to determine whether abiotic and biotic factors have an impact. Both of these variables are linked to the level of community stability. This occurs because different types of plants coexist in one community. As a result, the longer the community exists, the more stable and diverse the plant diversity will be. Anaphalis was discovered to live in areas with canopy shade from large open trees in this study. This ensures that the community below it receives enough sunlight to grow and increase its population via the metabolic process known as photosynthesis.

The intensity of sunlight, which is a source of energy, is required in the photosynthesis process to produce carbohydrates and oxygen. However, if the light intensity obtained is too high, the hormone auxin is reduced, which can inhibit growth. As a result, Anaphalis is dependent on environmental

conditions with sufficient sunlight intensity. Furthermore, the distribution of Anaphalis is influenced by interactions between vegetation, temperature, air humidity, and soil.

The composition of vegetation types in the entire research area has a total of 12 types of vegetation in this study, including Anaphalis spp. Plot 4 is known to have the highest IVI result among the other plots, with a value of 108.89. Plot 4 is known to have only 6 types of vegetation, including Anaphalis, out of the 12 types of vegetation spread. Because there is no other vegetation around Anaphalis, the area in plot 4 has a sparse or open canopy character. This open area allows more sunlight to reach this area. Anaphalis can develop well in plot 4 due to the high intensity of sunlight.

Anaphalis sp. is found in Poncokusumo District, which has an annual rainfall of 1,596 mm and 84.85 rainy days (RPIJM, 2015). According to Gemsih (2017), rainfall has a significant impact on the distribution and growth of vegetation. The *Anaphalis* sp. were discovered at an altitude of 2000-3000 meters in this study. Researchers can analyze wind speed in a location by knowing the height of vegetation. According to Gemsih (2017)'s research on Anaphalis, wind speed influences the number of Anaphalis. The lower the number of Anaphalis found, the faster the wind speed. This, however, is inversely proportional to Anaphalis reproduction and spread because the higher the wind speed, the wider the spread. This occurs because Anaphalis produces seeds that spread more widely when exposed to wind (Gemsih et al., 2017).

Many things must be planned in order to meet the needs of preserving the Anaphalis in the village of Poncokusumo. Several efforts must be made, including cultivation efforts by residents and training on cultivating edelweiss seeds so that the community can begin conservation. This Anaphalis nursery can be completed quickly by strategically placing nurseries near residential areas that are easy to care for. Because Anaphalis live at altitudes ranging from 2000 to 3000 meters, the conservation organization must determine which areas are suitable for cultivating these Anaphalis.

Apart from helping to conserve Anaphalis, this cultivation could pave the way for the establishment of an Anaphalis tourism village in Poncokusumo. The goal is to not only preserve this analysis, but also to improve the Poncokusumo people's economy. Furthermore, it is necessary to strengthen the law that governs Anaphalis conservation so that harmful efforts that threaten the extinction of Anaphalis can be carried out in accordance with the applicable legal process.

REFERENCES

EDELWEISS (*ANAPHALIS* sp.)

Anaphalis is a genus of plants in the Asteraceae family. There aren't enough species in a genus to go around (Nelson, Guy L, 2006). Anaphalis Margarita is the only Anaphalis species found in North America. While in Indonesia, particularly on the Javan islands, two types of Anaphalis are found: *A. javanica* and *A. longifolia*. *Anaphalis javanica* is also known as Java Edelweiss and Senduro Flowers.

Anaphalis javanica This is an endemic sign found in the high mountains of Indonesia that is on the verge of extinction. So, at the time, this plant was classified as rare vegetation and was one of the pioneer plants on the ground Volcanic in the area mountains. *A. Javanica* is a type of capable plant that lives in barren land in order to maintain his life's continuity. This occurs because Anaphalis is capable of causing mycorrhizae to use mushrooms on the ground, which is very effective in expanding the area available for nutrition.

Anaphalis will bloom between April and August (Nelson, Guy L, 2006). When Anaphalis is left until it has a strong stem, it can become a strong nest for insects and birds. There are several reasons why Anaphalis is taken and picked by the community, including aesthetic, spiritual, and a number of climbers who take only to remember memories. This action causes many losses, particularly to the environment and to Anaphalis's life.

Anaphalis is a simple plant to cultivate; all that is required is a cut in the trunk. Anaphalis is one of the most abundant and productive plants. Anaphalis is located on the mountain Papandayan, specifically in Tegal Alun, Gunung Big, specifically in Surya Kencana Square, Gunung Pangrango, specifically in Mandalawangi Square, and Gunung Rinjani, specifically in Plawangan Build.

Anaphalis is an Asteraceaceae family member that lives in tropical areas with

elevations ranging from 1,600 to 3,600 masl. Despite the fact that this is a high-altitude area, the environment is not friendly. However, because Anaphalis is capable of enduring life with less land nutrition through root yyang shape micariza (van Steenis , 1972).

Sumatra has only found two types of Anaphalis, the same as Java, namely *A. javanica* and *A. longngifolia*. However, there are a number of species that have yet to be identified because their structure morphology is similar to that of the second type. The two types share the following characteristics: existence distance between segments, pole growth leaf, shape edge leaf, width from achene, adda trichomes on the lower leaf, and color filarial tip. The distance between segments, the width of the achene, and the pattern growing leaf are all characteristics of *A. javanica*. Whereas form edge leaves, existence trichomes on the bottom leaf until The color at the tip of the filarial is typical of *A. longifolia.* With a high ratio of structure morphology, researchers may be able to find proof of hybridization. This mother shows characteristics from both parents, but it should be noted at the bottom that a number of intermediary morphologies can also experience development through natural selection or evolution convergent no through hybridization (Du, G., Zhang, Z., Li, Q. 2012).

Methods used, like environmental factors that can influence morphology, are not always accurate. As a result, researchers will face challenges if they confirm a hybrid by demonstrating its morphology.

At the time of writing, some hybrid has been confirmed by several researchers via method anatomy. This method can become additional data in the form of feature working anatomy for set cases hybrid that haven't been identified. As a result of this approach, which is method hybridization and anatomy, the results study will be more accurate for set hybrid state experience from analysts discovered by researchers.

A hybrid experience between *A. Javanica* and *A. longifolia* has been discovered in the gutters of Mt West Sumatra. Characteristic anatomy in the form of leaves and stems was used to clarify the suspected status is hybrid natural. Anaphalis was studied by making transverse and paradermal slices on stems and leaves using Johansen's method. According to the findings of the research, hybrids have seven characteristics: existing density, no stomata, width, length and ratio both, sum layer on the cortex, length of cortex, and wide cortex near *A. longifolia*. The coral's structure from layer flower is similar to that of *A. javanica*.

Anaphalis is found in areas with elevations ranging from 1600 to 3600 meters above sea level, and the current temperature ranges from 50 to 250 degrees Celsius (Vigneron, 2008). Anaphalis, on the other hand, was discovered at an altitude of 800 masl (Yuzammi et al, 2010).

Anaphalis was previously used as an ingredient in the manufacture of drugs to treat dysentery, diarrhea, and tuberculosis. Anaphalis extracts are frequently added to mixed milk with honey. This was done because Anaphalis has anti-inflammatory properties and contains antimicrobial and antioxidants (Whitten et al, 1992).

Many people are looking for Anaphalis this good only for display or for commercial purposes. Despite its existence, Anaphalis is currently threatened, extinct, and under severe threat. This Edelweiss Plant requires a very long time to grow large, as analysts who are 20 cm tall require over 13 years to grow, and it is still unknown how Anaphalis reproduces at this time.

Indonesia is well-known for having the highest biodiversity in the world. This happens because Indonesia is on the equator, which makes it rich in flora and fauna, including Anaphalis diversity. Anaphalis, a mountain plant that is also a member of the Asteraceae family, is one of the most prolific flowering plants in Malesiana. Anaphalis is a flowering woody herb from the Asteraceae family (Tjitrosoedirdjo, 2002).

Characteristics of the family include its widespread distribution in Europe, America, and Asia (Chanchani et al. 2007). Aside from that, Anaphalis has a strong odor that lasts for a long time after being picked. This is what leads to Anaphalis being selected for use as a souvenir (Sulistyawati et al. 2017). Anaphalis has a distribution pattern that is neither regular nor random in some group (Amaral et al. 2015). The term "distribution pattern" refers to the spatial

spread of something in an ecosystem (Roziaty 2019).

This scatter pattern has a tight hug with the surrounding environment. Every organism is dependent on the others. When there are disturbing organisms or environmental factors that influence, this can have an impact on the entire community. Anaphalis longifolia is primarily grown in North Sumatra, specifically in the districts of Samosir, Toba, and Karo (Prakarsa et al. 2018). A number of areas, not only in East Java, but also in Gunung Papandayan, West Java, are under threat of extinction for Anaphalis (Sulistyawati et al. 2017). Problems encountered by the public around the forest that does exploitation plant this for do ceremony area they (Pramita et al. 2013).

Lawu, in addition to being located on a mountain, has a diverse biological population, including both flora and fauna. Mountain Lawu, located on the Indonesian island of Java, has an elevation of 3,265 meters above sea level. Mountain Lawu is divided into three counties: Ngawi, Magetan, and Karanganyar. Climbers can pass climbing track scorn until they reach the peak of Mountain Fight. Anaphalis on the Mountain Lawu is a favorite of climbers and can be found at elevations ranging from 2,800 to 3,000 meters.

Conservation in the Brmo. National Park Area perch Semeru necessitated a thorough understanding of the profile and habitat. There are several reasons why Anaphalis can develop, one of which is because of volcanic activity. Because Anaphalis grows in muddy, sandy, and dusty soil. Anaphalis face stiff competition in the wild from weeds and other plant species. Type the plant in question, such as Agrostis sp., Imperata cylindrical, Pteridium sp., Alchemilla sp., Eupatorium sp., and Leucaena sp. This plant is very important in becoming a competitor Anaphalis in its habitat.

MOUNTAIN ECOSYSTEM

According to the United Nations Environment Program's World Conservation Monitoring Center (which uses elevation and slope as primary criteria), approximately 23% of the global land area can be classified as mountainous. For mountainous areas where latitude and rainfall regimes affect vegetation growth, three belts can be distinguished based on altitude: the mountain belt, which extends from the mountain's base to the forest's top; the forest belt, which extends from the forest's top to the mountain's base. The Alpine Belt, which is the treeless region between the natural climate forest line and the snow line, and The Snow Belt, which is the area above the snow line.

Many biophysical processes in mountainous environments are influenced by altitude and slope. However, latitude and distance from the oceans influence local climate, causing some mountains to be almost always wet, others to be dry, and still others to be highly seasonal. Geological substrates influence soil types, erosion processes, and vegetation cover, adding a new dimension to biodiversity. Physical processes such as erosion, landslides, avalanches, and rockfall affect environmental conditions at various spatial and temporal scales in many mountainous areas around the world. When volcanic or seismic activity is present, these processes are accelerated, especially in geologically young and steep mountainous areas (eg the Alps and Himalayas).

Lower mountain slope vegetation is generally similar to that of the surrounding lowlands, but within a 1,000-meter elevation range, altitude-related temperature changes are sufficient to cause one bioclimatic vegetation belt to be replaced by another (e.g., montane forest by alpine).

Because of the compression of climatic zones along elevation gradients, biodiversity in the mountains frequently exceeds that in the lowlands. Mountainous areas are home to 32% of the world's protected areas, which provide habitat for endangered species, heritage and endangered plants and animals. Twenty percent of the world's 1.2 billion people live in the mountains, primarily in the lowlands.

The majority of the 90 million people who live above 2,500 meters live in poverty and are considered extremely vulnerable to food insecurity. There are numerous historical examples of prosperous mining economies and societies. Special efforts and techniques, however, are required to maintain agricultural production in the highlands. near the tree's top line In addition, the mountains are dominated by the lowland economy and people. Although there are some exceptions, exploitation of mountain resources (soil, grassland, timber, minerals, recreation areas, etc.) is rarely beneficial to local communities.

BIODIVERSITY CONSERVATION

Biodiversity conservation is an effort to protect and manage biological diversity. To obtain Source Power that can be used for long-term development. A number of the objectives are as follows.

The preservation of life's diversity is a means of utilizing a sustainable ecosystem. Efforts should be made to support the system's maintenance life as well as the ecological processes that occur. Whereas diversity is based on the variability of life on Earth. Preservation is accomplished through in-situ and/or ex-situ conservation.

In-situ Conservation is defined as conservation that takes place in the original habitat. The goal is to permanently protect the ecosystem-owned nature. A number of advantages can be obtained from conservation implementation, one of which is the method used, which includes a low cost and ease of implementation.

Concurrent conservation can be carried out by organisms within an ecosystem. Because organisms are in natural ecosystems, they can develop more quickly and easily adapt to changing environmental conditions. National parks, nature reserves, and biosphere reserves are examples of special protected areas where in situ conservation takes place.

National Parks are smaller nature reserves that are managed by the government. Some boundaries in the area limit human activities with natural life in national parks. Some activities are prohibited, such as herding livestock and cultivating. Bandipur and Kanha National Parks are two examples of active National Parks.

It is a wilderness area with only wild animals, but there are no restrictions on carrying out human activities such as harvesting wood, cultivating, and taking forest products as long as they do not interfere with conservation projects. Tourists also visit these areas for recreation.

Biosphere Reserves are multi-purpose conservation areas that safeguard wildlife, traditional human lifestyles, plants, and pets. Tourism and research are permitted here.

Ex situ conservation entails the process of reproduction as well as the preservation of vegetation types that are on the verge of extinction. As a result, artificial ecosystems such as zoos, botanical gardens, nurseries, and gene banks have been created. As a result, the competition for food, water, and territory will be more intense.

Profits from the implementation of ex-situ conservation. Organisms have enough time to develop and reproduce. Existing animals in captivity can be introduced and eventually released into the wild. Through genetic engineering, it is possible to save threatened and endangered species from extinction.

BIODIVERSITY CONSERVATION STRATEGY

This section contains some strategies for doing conservation diversity live. All types of organisms, including good livestock, microbes, animals, pets, food, and plant wood, must be conserved. All valuable organisms pen by economy require identification. The preservation of the environment in a unique ecosystem must come first. Suber Power must be able to be used. Take precautions when hunting wildlife. It is necessary to protect and preserve the natural environment in the development area.

Pollutants in the environment must be reduced. Firm's prohibition on deforestation The environment requires strict adherence to the law. It is necessary to preserve types of useful and threatened plants in order to prevent them from becoming extinct. It is necessary to raise public awareness about the importance of conserving biodiversity in the living world.

BIODIVERSITY MAPPING

Plants on low mountain slopes, specifically at an altitude of around 1,000 meters, experience temperature changes that affect the existing vegetation. The diversity found in mountainous areas differs from the diversity found in low-altitude areas. Mountainous areas are home to 32% of the world's protected forests. However, some of them are on the verge of extinction. This occurs because the activities of various communities in the mountains have an impact on the original habitat of vegetation. This is due to the fact that approximately 90 million people live in mountainous areas, which are vulnerable to poverty and a lack of food.

There are many historical examples of mining economies and communities rapidly

expanding, but special efforts and techniques are required to maintain agricultural production in the highlands. In addition, the mountains are dominated by the lowland economy and people. While there are some exceptions, exploitation of mountainous resources (soil, grassland, timber, minerals, recreation areas, etc.) is very rare.

CONCLUSION

Poncokusumo is an important area for Anaphalis ex-situ conservation outside of the Anaphalis conservation area, specifically the Tengger Mountains, which are home to many Anaphalis. This study also confirms the identification of two species, namely javanica and longifolia. Anaphalis data dominated growth in each plot, according to the findings of research on five plots distributed by researchers. The results of the significant value index, which is the sum of the relative frequency, relative density, and relative dominance of the habitat area, indicate this. Anaphalis has a high percentage in each plot, which is greater than 50.

The average diversity index value in the five plots was H 1 < H 3. This means that Anaphalis spp. has a fairly good ability to maintain stability despite disturbances in its components.

Anaphalis was the dominant and most influential plant species in the plot. Furthermore, Anaphalis has good adaptability in its habitat and a high tolerance value to its environment, with the highest important index value compared to other surrounding vegetation.

This study also discovered which abiotic factors influence Anaphalis's life and distribution. Rainfall, wind, and the intensity of sunlight are all influencing factors.

Some suggestions for future research can be made based on the results of the research that has been analyzed. Researchers studying Anaphalis diversity in the Poncokusumo Village area are expected to be able to conduct more in-depth research and analysis on the spread of Anaphalis. The goal is for Anaphalis in the Poncokusumo area to take conservation and protection measures to ensure their continued existence. Furthermore, it is necessary to strengthen the applicable laws and regulations in order to reduce the perpetrators of crimes that harm biodiversity, specifically the protection of protected plants from being taken, picked, and brought home to be traded. The ecotourism movement and support for biological conservation policies are two conservation strategies that can be used.

ATTACHEMENT

Table 5. Plant Species Ground Above Poncokusumo District

No	Local Name	Family	Genus	Species
1	Jawa-Edelweis. Mutiara atau mutiara abadi.	*Asteraceae*	Anaphalis	*Anaphalis longifolia* *Anaphalis Javanica*
2	Napiergrass , elephant grass atau Uganda grass	Poaceae	Purpureum	*Purpureum sp*
3	Gunung Bladderfern .	Cystopteridaceae	Sistopteris	*Sistopteris montana*
4	Meadowsweet Reeves, Spiraea Reeve, Spiraea Cina, Spiraea Mei	Rosaceae	Spiraea	*Spiraea cantoniensis lour*
5	Rumput Kerbau	Poaceae	Bouteloua	Bouteloua *dactyloides*
6	Lumut Mengangguk, Staghorn	Lycopodiaceae	Palhinhaea	*Lycopodiella cernua(L)Pic Serm*
7	Pakis Natal	Dryopteridaceae	Polistikum	*Polistikum acrostichoides*
8	Spurge yang Anggun	Euphobiaceae	Euforia	*Euforia hypericifolia*
9	Sarsaparilla Liar	Araliaceae	Aralia	*Aralia nudicaulis*
10	Nightshade Cutleaf	Solanaceae	Solanum	*Solanum triflorum*
11	Bunga Rumbai Florida	Asteraceae	Emilia	*Emilia fosbergii*
12	Rumput Bermuda	Poaceae	Cynodon	*Cynodon dactylon*

Table 6. Important Anaphalis Value Index of Each Plot

No	Taxa	Plot 1	Plot 2	Plot 3	Plot 4	Plot 5
1	*Anaphalis*	54.52	61.65	81.33	108.89	80.96
2	*Napier grass*	38.35	25.24			6.92
3	*Mountain Bladder fern*	21.60	7.88	11.77	28.70	43.03
4	*Spiraea cantoniensis lour*	40.81	18.65			
5	*Buffalo grass*	22.11	47.93	43.01	19.76	34.90
6	*Cutleaf Nightshade*	16.60		11.77	8.94	11.15
7	*Emilia fosbergii Nicolson*	6.02				
8	*Lycopodiella cernua*		12.37			
9	*Chrismas Fern*		4.12			
10	*Euphobia hypericifolia*		13.05	33.27	19.76	6.15
11	*Red sarsaparilla*		9.11		13.94	16.90
12	*Cynodon dactylon*			18.85		

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REFERENCES

Ade, Filza Y., L. Hakim., E. L. Arumingtyas & R. Azrianingsih. 2019. Habitat *Anaphalis* spp. in Tourism Area in Bromo Tengger Semeru National Park, East Java. J-PAL, 10(2), 137-141

Alix, M.S., Scribailo, R.W. 2006. First report of *Potamogeton x Undulatus* (*P. Crispus x P. Praelongus*, Potamogetonaceae) in North America, with notes on morphology and stem anatomy. Rhodora. 108(936): 329346, http://dx.doi.org/10.

Cetzal-Ix, W., Carnevali, G., Noguera-Savelli, E., Jauregui, D. 2013. Morphological and anatomical characterization of new natural hibrid between

Cohniella ascendens dan C. brachyphylla (Oncidiinae : Orchidaceae). Phytotaxa. 144(2): 45- 55, http://dx.doi.org/10.11646/phytotaxa.144.2.2

Dan, I., Hijauan, I., Desa, D. I., Simpang, S. E. I., Kecamatan, D. U. A., Kiri, K., Kampar, K., & Wahyudi, I. (2010). *PROGRAM STUDI PETERNAKAN*.

Dumadi, E. H., Abdullah, L., & Sukria, H. A. (2021). *J i n t p*. *19*(1), 6–13. https://doi.org/DOI: http://dx.doi.org/10.29244/jintp.19.1.6-13 J

Dewantara, I. G. K., Atma, U., Yogyakarta, J., Teknobiologi, F., & Biologi, P. S. (2017). *Jurnal skripsi*. 1–15.

Donoso, S., Landrum, L.R. 1979. *Nothfagus leoni* Espinosa, a natural hybrid between *Nothofagus oblique* (Mirb.) Oerst. and *Nothfagus glauca* (Phil.)

Edi, Syahmi, Hary Prakasa, Yusran Efendi Ritonga. 2020. ANALISIS VARIASI MORFOLOGI DAN HABITAT EDELWEIS (Anaphalis spp.) DI KAWASAN SEKITAR DANAU TOBA. JBIO: JURNAL BIOSAINS. (The Journal of Biosciences) 6 (1):27-31.

Encheva, J., Christov, M. 2005. Intergeneric hybrids between cultivated sunflower (*Helianthus annulus* L.) and *Verbesina helianthoides* (genus verbesina) morphological and biochemical aspects.

Helia. 28(42): 27-36, doi: 10.2298/ HEL 0542027E.

Gemsih, M., Djufri, & Supriatno. (2017). Jurnal Ilmiah Mahasiswa Fakultas Keguruan dan Ilmu Pendidikan Unsyiah Vol 2, No 1 (2017); Pebruari 2017. *Jurnal Ilmiah Mahasiswa Fakultas Keguruan Dan Ilmu Pendidikan Unsyiah*, *2*(1), 78–89.

Hamilton, J.A., Aitken, S.N. 2013. Genetic and morphological structure of a spruce hybrid *(Picea sitchensis x P. glauca)* one along a climatic gradient.

Hakim, L., &Miyakawa, H. (2013). Plant trees species for restoration program in Ranupani, Bromo Tengger Semeru National Park Indonesia. Biodiversity Journal, 4(3), 387-394.

Hoyo, Y., Tsuyuzaki, S. 2013. Characteristics of leaf shapes among two parental *Drosera* species and hybrid examined by canonical discriminantanalysis and a hierarchical bayesian model. Am. J. Bot. 100(5): 817823, doi: 10.3732/ajb.1200510.

Kuswanto Lianah ,Noor Amalia Chusna, Eko Purnomo, Krisantini, and Milya Urfa Ahmad. 2021. Identification and documentation of wild plant species with ornamental potentials at Mount Prau, Central Java, Indonesia. Ornamental Horticulture. SBFPO. 28 (1) : 110-119.

KSDAE. 2020. Peraturan Menteri 106 (2018). Http://www. Ksdae.menlhk.go.id. Acessed on 29 September 2020.

Morfometri, A., Anaphalis, R., & Barat, S. (2013). *Analisis Morfometri dan Biologi Reproduksi*. *4*(7), 2013.

Nielsen, D. (2019). *Habitat Distribution and Frond Reorientation as Photoprotection and*

Drought-Avoidance Mecanism in Crismast Fern. *1*(August), 105–112.

Nesom, Guy L. *(2006).* "Anaphalis". *In Flora of North America Editorial Committee, eds. 1993+ (ed.). Flora of North America.* ***19****. New York & Oxford: Oxford University Press. p. 426.*

Nitu, S. K., & Islam, S. M. S. (2019). Morphological characteristics of different accessions of Cynodon dactylon (L.) Pers. and physicochemical properties of soil of their growing region in Bangladesh. *International Journal of Biosciences (IJB)*, *September 2020*. https://doi.org/10.12692/ijb/15.5.350-369

Pan, Y., Shi, S., Gong, XX., Kuroda, C. 2008. A natural hybrid between *Ligularia paradoxa* and *L. duciformis* (Asteraceae, Senecioneae) from Yunnan, China. Annals of the Missouri Botanial Garden. 95(3): 487-494, http://dx.doi.org/10.3417/ 2006034. Du, G., Zhang, Z., Li, Q. 2012. Morphological and molecular evidence for natural hybridization in sympatric population of *Roscoea humeana* and *R. cautleoides* (Zingiberacea). J. Plant Res. 125: 595- 603, doi: 10.1007/s10265-012-0478-6

Pardianti, R., D. T. Adriyani & A. Syahbudin. 2014. Persebaran Edelweiss (*Anaphalis* spp.) Pada Sub Tipe Hutan Montana Dan Alpin Di Taman Nasional Gunung Gede Pangrango. Prosiding Seminar Nasional Silvikultur II P13, 350-355.

Prakasa, H., Akmal, A. Z., Guci, W. A., & Edi, S. (2018). ANALISIS HABITAT (Anaphalis longifolia (Blume) Blume ex DC.) DI SUMATERA UTARA. *Jurnal Biosains*, *4*(2), 78. https://doi.org/10.24114/jbio.v4i2.10254

RPIJM, R. P. I. J. M. (2015). Gambaran Umum dan Kondisi Wilayah Kabupaten Malang. *Rencana Program Investasi Jangka Menengan (RPIJM)*, *BAB 6*, 1–31.

Roziaty, E & N. M. Wijaya. 2019. Diversity and distribution pattern of *Anaphalis* sp. (Edelweis) in the Cemoro Sewu Climbing Track in Mount Lawu Magetan, East Java, Indonesia. Eurasia J Biosci 13, 1755-1762.

Sciandrello, S., Giusso del Galdo, G., & Minissale, P. (2016). Euphorbia hypericifolia L. (Euphorbiaceae), a new Alien Species for Italy. *Webbia*, *71*(1), 163–168. https://doi.org/10.1080/00837792.2016.1152669

Setyawati, T., Narulita, S., Bahri, I. P., & Raharjo, G. T. (2015). *A Guide Book to Invasive Plant Species in Indonesia*.

Sofiyanti, N., & Isda, M. N. (2019). Paku Kawat Lycopodiella cernua (L.) Pic. Serm. (Lycopdiaceae-Lycopodiales) dari Provinsi Riau – Kajian Morfologi dan Sekuen DNA berdasarkan Primer RBCL. *Jurnal Biologi UNAND*, *7*(1), 43. https://doi.org/10.25077/jbioua.7.1.43-50.2019

Song, Y., Deng, M., Hipp, A.L., Li, Q. 2015. Leaf morphological evidence of natural hybridization between two oak species (*Quercus austrocochinchinensis* and *Q. kerrii*) and its implications for conservation management. Eur. J. Forest Res. 134: 139-151, doi 10.1007/s10342014-0839-x.

Taufiq, A. 2009. Studi Taksonomi Edelweis *(Anaphalis* spp.) di Sumatera Barat. Skripsi Sarjana Biologi. FMIPA Universitas Andalas. Padang.

Tjitrosoedirjo, S.S. 2000. The Asteraceae of Sumatera. Post Graduate Programme. Institut Pertanian Bogor. Indonesia.

Van steenis, C.G.G.J. 1972. The Mountain Flora of Java. Leiden: E.J. Brill.

Wahyudi, I. (2010). *Inventarisasi dan Identifikasi Hijauan Pakan di Desa Sei Simpang Dua Kecamatan kampar Kiri Hilir Kabupaten Kampar*.

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