

# ASSOCIATIVE ANALYSIS BETWEEN BEHAVIOR AND CONSERVATION KNOWLEDGE WITH CLIMBER'S PERCEPTIONS OF EDELWEISS (*anaphalis javanica*) ABUNDANCE IN GUNUNG GEDE PANGRANGO NATIONAL PARK

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**Abstrak.** Edelweiss in Gunung Gede Pangrango National Park (GGPNP) is one of the flora that has its attraction in supporting natural climbing tourism activities. The existence of this climbing activity with various types of climbing goals, climber behavior, limited knowledge in conservation, and so on will provide opportunities for threats to the edelweiss biodiversity. The purpose of research are to know the relationship between climber's behavior with perceptions of Edelweiss abundance, the relationship between conservation knowledge with perceptions of Edelweiss abundance, and the relationship together climber's behavior, and conservation knowledge with perceptions of Edelweiss abundance (*Anaphalis javanica*) in, GGPNP. The method of collecting data to obtain primary data in the field is a non-test technique (questionnaire) in the form of a questionnaire composed of several statements relating to each variable and indicators of research variables. Hypothesis test is used the regression and correlation analysis. The results showed that there was a positive and significant relationship between climber behavior (X1) and perceptions of Edelweiss abundance in GGPNP (Y) with a correlation coefficient (r) = 0.948. This relationship can be made by the equation = 47.809+0.338 X1. There is a positive and significant relationship between conservation knowledge (X2) and perceptions of edelweiss abundance (Y) with a correlation coefficient (r) = 0.957. This relationship can be made by the equation = 47.809 + 1.316 X2. There is a positive and significant relationship between climber behavior (X1) and conservation knowledge (X2) together with the perception of edelweiss abundance (Y) with a correlation coefficient (r) = 0.966. The relationship can be made the equation = 47.809 + 0.338X1 + 1.316X2. Implications that can be carried out as a follow-up to the results of this study include the need for continuous efforts to improve conservation behavior and knowledge of climbers, especially those who climb Mount Gede Pangrango.

**Keywords:** climber behavior; conservation knowledge; Gunung Gede Pangrango National Park; perception of edelweiss

## I. INTRODUCTION

Mount Gede Pangrango National Park (*Taman Nasional Gunung Gede Pangrango - TNGGP*) is the largest remaining conservation area on the Java island (Pramesiti [1]; Sofiyudin [2]), which is currently one of the climbing tourist destinations and has even become a favorite climbing location in West Java [2]. TNGGP, an area of 24,270.80 Ha, is geographically located between 106°51`-107°02` east longitude and 6°41`-6°51` south latitude. Administratively, located in three regencies in West Java Province, i.e.: Cianjur, Sukabumi, and Bogor. According to Ario [3], this conservation area is also home to the top predator of Javan leopard (*Panthera pardus melas*). Edelweiss is the mascot flora of TNGGP that is protected by law, as efforts to maintain sustainability in its natural habitat continue to be carried out by managers such as habitat development, population monitoring, and so on. Edelweiss in TNGGP is one of the floras that has its charm in supporting natural climbing tourism activities. Then from the ecological aspect, in Edelweiss plants there are approximately 300 species of

insects from the orders Hemiptera, Thysanoptera, Lepidoptera, Diptera, and Hymenoptera found in Edelweiss flowers. Edelweiss plants have gaps in their bark and contain a lot of water, so they can be a place to live for several types of mosses and lichens, such as Cladonia, Calycantha, and Cetraria (Van Leeuwen, in Aliadi [4]). The following graphic is the development of the number of visitors who hiked at TNGGP in the last five years as shown in Figure 1.

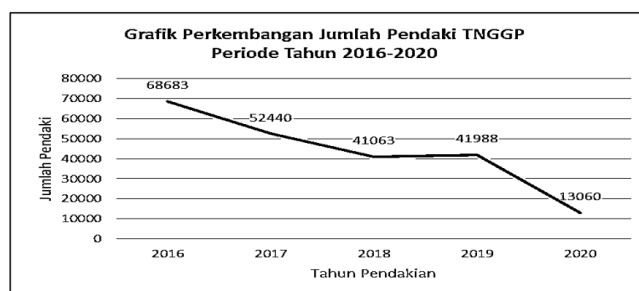


Figure 1. Trend on number of Climbing TNGGP for the 2016-2020 period

Van Leeuwen in Aliadi [4] states that Edelweiss has high ecological benefits, its flowers are a source of food for insects. There are approximately 300 species of insects from the orders Hemiptera, Thysanoptera, Lepidoptera, Diptera, and Hymenoptera found in Edelweiss flowers. Edelweiss plants in the bark are cracked and contain a lot of water, so they can be a place to live for several types of mosses and lichens, such as Cladonia, Calycantha, and Cetraria. Edelweiss roots appear on the soil surface where certain fungi live to form mycorrhizae. The fungi get oxygen and a place to live, while Edelweiss gets nutrients from the fungus (Van Faber in Van Leeuwen [5]).

In Indonesia, there are 4 (four) types of Edelweiss plants and they are often found in climbing locations, i.e.: *Anaphalis javanica*, *Anaphalis longifolia*, *Anaphalis viscida*, and *Anaphalis maxima*. According to van Steenis [6], there are 3 (three) types of *Anaphalis* in TNGGP, i.e.: *Anaphalis javanica*, *Anaphalis longifolia*, and *Anaphalis maxima*. There are 4 (four) Edelweiss species, only *Anaphalis javanica* is protected (Figure 2).



Figure 2. GNP has three types of edelweiss, i.e.: *Anaphalis javanica*, *Anaphalis longifolia*, and *Anaphalis maxima* from four types of edelweiss plants, that are often found in climbing locations in Indonesia.

The 2020 TNGGP data reported that there has been a decline in the Edelweiss population in Suryakencana Square (Gunung Gede). It is caused by factors such as natural weather, natural succession, and people activities. According to these factors, research titled with 'Associative analysis

between climber behavior and conservation knowledge on the Perception of Abundance of Edelweiss (*Anaphalis javanica*) at Suryakencana Square, Gunung Gede Pangrango National Park will be conducted.

The purpose of the research is:

1. The influence of climber behavior on the perception of the abundance of edelweiss (*Anaphalis javanica*) in Suryakencana Square, Gunung Gede Pangrango National Park.
2. The effect of conservation knowledge on perceptions of the abundance of edelweiss (*Anaphalis javanica*) in Suryakencana Square, Gunung Gede Pangrango National Park.
3. The influence of climber behavior and conservation knowledge on perceptions of the abundance of edelweiss (*Anaphalis javanica*) in Suryakencana Square, Gunung Gede Pangrango National Park.

Based on the problem, research objectives, theoretical basis, and framework of thinking, the hypotheses of researchers are:

- a. H1: The behavior of climbers (X1) influence the Perception of the Abundance of Edelweiss in Suryakencana Square, TNGGP.
- b. H2: Knowledge of Conservation (X1) influence Perception of Abundance of Edelweiss in Suryakencana Square, TNGGP.
- c. H3: Climber's Behavior (X1) and Conservation Knowledge (X2) influence on the Perception of Abundance of Edelweiss in Suryakencana Square, TNGGP.

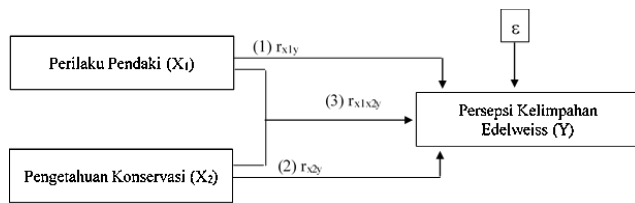
## II. RESEARCH METHODS

The method of data collection to obtain primary data in the field is a non-test technique (questionnaire) in the form of a questionnaire (Sofiyudin [2]). The questionnaire contains several statements relating to each of the variables and indicators of the research variables. The data obtained in the study were then analyzed descriptively and inferentially. The descriptive analysis presents data with histograms and calculates consists of presenting data with histograms and calculating the mean, mode, standard deviation, and theoretical range. Inferential analysis (hypothesis test) with regression and correlation analysis [7].

The unit of analysis in this study is the climber in the Gunung Gede Pangrango National Park. In this study, there is one dependent variable, namely Perception of Abundance of Edelweiss (Y), and two independent variables, namely Climber Behavior (X1) and Conservation Knowledge (X2). The constellation of each variable is shown in Figure 3. The research instrument in the form of a questionnaire consists of 1) a questionnaire on the behavior of climbers, and 2) a questionnaire on Conservation Knowledge. 3) a questionnaire on Edelweiss Abundance Perceptions.

Furthermore, conceptual definitions, operational definitions, grids, and instrument calibration of research variables. The statistical hypothesis in this study is as follows:

$$H_0 : \rho_{y.x1} \leq 0, \quad H_1 : \rho_{y.x1} > 0$$



Notes:  
 (1) = Correlation between X1 partially and Y ( $r_{x1y}$ )  
 (2) = Correlation between X2 partially and Y ( $r_{x2y}$ )  
 (3) = Correlation between X1 and X2 simultaneously with Y ( $r_{x1x2y}$ )

Figure 3. The constellation of each variable [7]

1. First hypothesis

Relationship between climber behavior and perceptions of edelweiss abundance.

$H_0: \rho_{y.x1} \leq 0$ : There is no relationship between climber behavior and perceptions of edelweiss abundance.

$H_1: \rho_{y.x1} > 0$ : There is a relationship between climber behavior and the perception of edelweiss abundance.

2. Second hypothesis

The relationship between conservation knowledge and perceptions of edelweiss abundance.

$H_0: \rho_{y.x2} \leq 0$ : There is no relationship between conservation knowledge and perceptions of edelweiss abundance.

$H_1: \rho_{y.x2} > 0$ : There is a relationship between conservation knowledge and perceptions of edelweiss abundance.

III. RESULTS AND DISCUSSION

Based on the frequency distribution of each interval as shown in table 4.4, it can be described explained that the highest frequency of respondents' scores is in the fifth interval class (150-157), with namely 32 respondents (26.67%) of the 120 respondents. This shows that 32 respondents have good behavior. A total of 15 respondents (12.5%) in the interval class (174-183) had quite high conservation knowledge and 3 respondents (2.5%) in the interval class (117-125) had low conservation knowledge from 120 respondents. The complete frequency distribution of climber behavior data (X2) can be shown in the following histogram (Figure 4.).

Based on the data processing and testing of the hypothesis, the results of the research can be concluded reported as follows: There is a positive relationship between Climber Behavior and Edelweiss Abundance Perception. Based on the tabulation of the perception of the abundance of Edelweiss data and the behavior of climbers, the results of the study obtained data that the average perception of Edelweiss abundance and the behavior of climbers that were sampled could be categorized as good. The test results of data analysis show that perceptions of Edelweiss abundance and climber behavior are normally distributed and the population of data is homogeneous. The regression equation is  $= 47.809 + 0.338 X1$ , which means that for every additional climbing behavior, the perception of Edelweiss abundance will increase by 0.338.

This means that the higher the climber's behavior will be followed by an increase in the perception of Edelweiss abundance. Conversely, the lower the climber's behavior, the lower the climber's perception of the Edelweiss delegation. According to Putranto [8], perception is the brain's ability to translate stimuli or processes to translate incoming stimuli into the human senses. In human perception, there are different points of view in the sense, that there are those who perceive something to be good or positive or negative perceptions that will affect visible or real human actions.

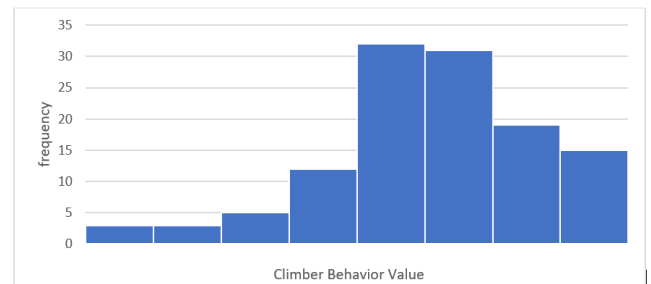


Figure 4. Histogram of Climber Behavior

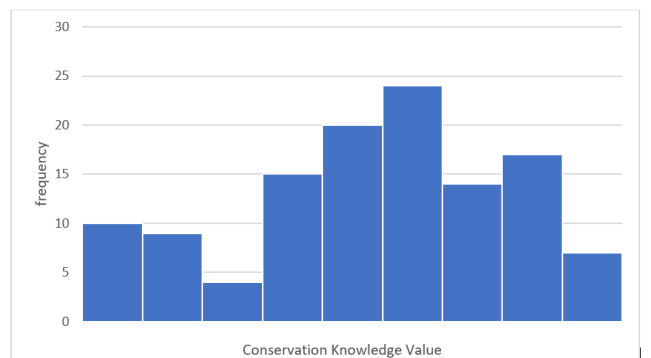


Figure 5. Conservation Knowledge Histogram

The strength of the relationship between climber behavior and the perception of Edelweiss abundance is shown by the correlation coefficient  $r_{y1}$  of 0.948 and the determinant coefficient ( $r^2_{y1}$ ) of 0.899 which means that the climber's behavior factor contributes 89.8% while 10.12% is influenced by other factors such as socioeconomic, religion, culture, environment, daily living habits, association, encouragement from friends, and so on. According to Fatwa [9], behavior is divided into two, passive and active behavior. Passive behavior is an internal response that occurs in humans and that is not directly visible to others, meaning someone who has positive knowledge to support a healthy life but he has not done it concretely. Meanwhile, active behavior is an act that can be observed directly, for example, someone who knows that maintaining cleanliness is very important for his health, does it well and can encourage others to do the same. Wahyudi [10] that the factor of mountaineers to protect their environment can be seen from the actions of climbers when climbing from attitudes, values, and actions of climbers. One of the attitudes taken by climbers is to prepare a container that



is used to store trash during the ascent. Climbers have begun to understand what they can and cannot do while in a protected area. In addition, the climbers have also started holding activities or participating in activities whose purpose is to protect the environment, such as in the form of mountain cleaning activities and tree planting activities. Sarah Fitriana [11] suggests that the role of tourists is very influential opinion the preservation of nature. This due to the lack of awareness of tourists about environmental sustainability, which results in environmental sustainability experiencing a decrease in quality. In this case, it is clear when climbers have the perception that the importance of Edelweiss sustainability, then the climbers will contribute to the sustainability of the Edelweiss plant. A positive relationship between Conservation Knowledge and Edelweiss Abundance Perception. Based on the data tabulation of Edelweiss Abundance Perception and Conservation Knowledge, the research results obtained data that the average Edelweiss abundance perception and conservation knowledge sampled could be categorized as good. From the results of testing the requirements of data analysis, it shows that the perception of Edelweiss abundance and knowledge of conservation is normally distributed and the population of the data is homogeneous [12]. The regression equation is  $= 47.809 + 1.316 X_2$ , which means that for each addition of conservation knowledge, the climber's perception of the abundance of Edelweiss will increase by 1.316. The strength of the relationship between conservation knowledge and perceptions of Edelweiss abundance is shown by a correlation coefficient of 0.957 and a determination coefficient of 0.916. This means that perceptions of Edelweiss abundance are influenced by conservation knowledge of 91.5%. The functional relationship between conservation knowledge and perceptions of Edelweiss abundance means that the higher the level of knowledge about natural resource conservation, the higher the perception of Edelweiss abundance in Suryakencana Square. Conversely, the lower the knowledge of natural resource conservation, the lower the climber's perception of understanding the abundance of Edelweiss in Suryakencana Square [13].

This research is in accordance with the results of research by Marningot T. N. Situmorang [14], there is a significant positive relationship between knowledge about the function of the national park and community participation in the conservation of the Gunung Gede Pangrango national park. Knowledge is a very influential factor in decision-making. A broad and good insight into the function of national parks will raise awareness and will further foster good behavior which is reflected in positive attitudes and actions, including in the form of participation in maintaining plants, growing awareness and a sense of responsibility, and being able to provide time, energy, thoughts and money for the creation of national park conservation.

This is in accordance with Waidi's theory [15], that one of the factors that influence the perception of each person is knowledge and point of view. More knowledge about natural resource conservation will encourage climbers to try to maintain the abundance of Edelweiss in their natural habitat

and try to reduce activities that can threaten the existence of Edelweiss in their natural habitat. Knowledge is the result of the climber's observation of an object he wants to know. Observations are carried out using a variety of senses to obtain a concept or theory about an object. Likewise, conservation knowledge implies the extent to which climbers know or understand the concept of natural resource conservation, which of course is applied to climbing locations (mountains), especially those with conservation area status. By having this understanding, it is hoped that climbers in carrying out their activities do not interfere with the integrity of existing potential such as not cutting down trees, not hunting animals, not burning, not taking Edelweiss flowers, not littering, and so on. Conservation of natural resources is carried out to maintain the integrity and preservation of the potential of natural resources so that they remain and can function and play an optimal role in supporting the lives of living things that exist in nature [16].

A positive relationship between Climber Behavior and Conservation Knowledge together on Edelweiss Abundance Perception. The relationship between the climber behavior variable and conservation knowledge together with the perception of Edelweiss abundance has a correlation coefficient of  $r_{12}$  of 0.966 so it can be interpreted that referring to the guideline for the degree of relationship Pearson Correlation value, this value shows a very high/perfect relationship between perceptions of Edelweiss abundance through climber behavior variables. and conservation knowledge together. The regression equation is  $= 47.809 + 0.338X_1 + 1.316X_2$  with a behavioral coefficient of 0.338, knowledge of 1.316 and a constant of 47.809.

The coefficient of determination of the climbing behavior variable is 89.8%, relatively lower than the coefficient of conservation knowledge of 91.5%. The difference in the value of the coefficient of determination between the two variables individually means that based on the respondents' assessments, the conservation knowledge factor provides a more positive and significant contribution to increasing the perception of Edelweiss abundance. However, the coefficient of determination of climber behavior and knowledge of conservation together is 93.31%, this value is high when compared to the coefficient of determination of climber behavior and knowledge of conservation individually. This shows the meaning that according to the respondents' assessment, the two factors of climber behavior and knowledge of conservation together turned out to make a significant contribution to increasing the perception of Edelweiss abundance. Climber behavior and conservation knowledge are correlated together and are mutually supportive factors to achieve the maximum perception of Edelweiss abundance. Based on the results of the research and discussion above, it can be concluded that different ways of using different senses

#### IV. CONCLUSION

This study aims to determine the relationship between climber behavior and conservation knowledge with

perceptions of Edelweiss abundance in Suryakencana Square, resulting in the following conclusions There is a positive and significant relationship between climber behavior (X1) and perceptions of Edelweiss abundance in Suryakencana Square, Mount Gede Pangrango National Park (Y) with a correlation coefficient (r) = 0.948. The relationship can be made by the equation =  $47.809+0.338 X1$ . There is a positive and significant relationship between conservation knowledge (X2) and perceptions of Edelweiss abundance in Suryakencana Square, Gunung Gede Pangrango National Park (Y) with a correlation coefficient (r) = 0.957. This relationship can be made by the equation =  $47,809+1,316 X2$ . There is a positive and significant relationship between climber behavior (X1) and conservation knowledge (X2) together with perceptions of Edelweiss abundance in Suryakencana Square, Gunung Gede Pangrango National Park (Y) with a correlation coefficient (r) = 0.966 Relationship From this, the equation =  $47.809 + 0.338X1 + 1.316X2$  can be made. From the conclusions above, it is obtained that there is a close relationship between climbers' behavior and climbers' perceptions of Edelweiss abundance with a correlation coefficient of 0.948, while the relationship between conservation knowledge and climbers' perceptions of Edelweiss abundance with a correlation coefficient of 0.957, and if the relationship between the two variables is jointly perception of the abundance of Edelweiss then the correlation coefficient is 0.966. The figures above show how the climber's perception of the abundance of Edelweiss has something to do with the level of behavior and conservation knowledge possessed by climbers. If the behavior of climbers is high, the perception of the abundance of Edelweiss will be high, as well as if the knowledge of conservation is high, the perception of the abundance of Edelweiss will also be high. Based on this analysis, the implications that can be carried out as a follow-up to the results of this study include the need for continuous efforts to improve conservation behavior and knowledge of climbers, especially those who climb Mount Gede Pangrango.

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