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Ecology Of Pranajiwa Medicinal Plants (*Euchresta horsfieldii* (lesch.) benn.) In Bali And Lombok: (A Review)

Rafika Rizki [1] , Ade Angelia Atmanegara Sinaga [2] , Suci Ristani Lase [3] , Nurlaini Nasution [4]

[1,2,3,4][Department of Biology, Faculty of Mathematics and Natural Sciences, Universitas Sumatera Utara]

Abstract. This article is a review of the ecology of pranajiwa medicinal plants in Bali and Lombok. In this article, the author discusses the characteristics of pranajiwa's original habitat in Bali and Lombok, the abundance, habitat vegetation, and distribution of pranajiwa, as well as environmental factors that affect pranajiwa's habitat. The purpose of this article is to identify the characteristics of pranajiwa's natural habitat in Bali and Lombok to ensure long-term preservation and sustainable use of pranajiwa.

Keyword: Ecology, Medicinal Plant, Pranajiwa, Bali, Lombok

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1 Introduction

Pranajiwa is a medicinal plant that is often used as a traditional medicine in Bali and Lombok. In Indonesia, pranajiwa's natural habitat is limited to tropical rain forests at an altitude of 1300-2400 m above sea level and is spread over Sumatra, Java, Bali and Nusa Tenggara [1]. The morphology of this plant is characterized by reaching 2 meters in height, sparse branching and having oval compound leaves. Fruits are small, shiny, oval. With a length of 1-2 cm. unripe fruit is green and when ripe is bluish black [2]. Its existence is rarely found in nature even though it has not been included in the IUCN *redlist* .

Some of the things that cause the rare of pranajiwa today because this plant is believed by the local community to be able to cure disease, although this research has not detailed the types of diseases that can be cured by pranajiwa. This reliance causes pranajiwa to be taken intensively

*Corresponding author at: Department of Biology, Faculty of Mathematics and Natural Sciences, Universitas Sumatera Utara

E-mail address : rafikarizki06@gmail.com

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without any cultivation efforts from the local community. In addition to these external factors, pranajiwa reproduction based on observations in the Bromo Tengger Semeru National Park shows a very small percentage, ranging from 2.7 to 8.7%. This value is very small for the continuity of regeneration or the continuity of its population in nature.

Based on the problems above, efforts to save the soul prana need to be done. One strategy are *in situ* and *ex situ conservation* . However, there have been no proper conservation efforts for pranajiwa in Bali and Lombok because most people do not understand the specific benefits of this medicinal plant . Sustainable use is necessary for pranajiwa conservation planning to ensure long-term preservation, it is very important to understand the ecological conditions and habitat of pranajiwa.

2 Research Purposes

The purpose of this study was to identify the characteristics of pranajiwa's natural habitat in Bali and Lombok. Information on the conditions where pranajiwa grows has important meaning, especially as a basis for determining the suitability of species for a particular land which can later be used as the basis for designing a strategy for the conservation of this plant.

3 Methods

The research was conducted at two locations in different years, location 1 Batukahu Nature Reserve (CAB) and location 2 Mount Rinjani National Park Area (TNGR), with a description of each. Materials and tools have been listed in the article . The research method used: *purposive sampling* method is in accordance with this study because the research object (pranajiwa) is believed to exist in both locations so that this method is considered effective and efficient to apply .

4 Result and Discussion

A. Characteristics of Pranajiwa Habitat in Bali and Lombok

Based on the results of the research conducted by the researchers, data were obtained as shown in Table 1. The characteristics of pranajiwa habitat in Bali and Lombok have the same climate, namely category B (wet) which is a wet area with tropical rain forest vegetation characteristics based on Schmidt and Fergusson's classification. This climate type goes hand in hand with cooler, more humid temperatures. The altitude where pranajiwa is found is classified as high, so it is very natural that the habitat for pranajiwa to grow is cool and damp. The topography where pranajiwa grows in Bali and Lombok is in the form of hills with slopes varying from flat to very steep. Based on the light intensity obtained at the two locations, information was obtained that

the two locations were open areas with tree shade conditions and were forests prone to landslides.

Table 1 Data on the pranajiwa environment in the observation plots of pranajiwa's habitat

Location	Climate type	Average and range of altitude (m)	Average and temperature range (^{0}C)	Average and humidity range (%)	Average and range of light intensity (lux)	Average and range of slope gradients
Bali	B	1,458 (1,401-1,510)	20 (17-23)	80 (71-90)	475 (200-1,070)	steep (slightly steep-very steep)
Lombok	B	1.268 (1.241-1.344)	21 (19-23)	80 (74-86)	400 (200-600)	rather steep (flat-slightly steep)

In addition to analyzing the environmental data of pranajiwa in the observation plots of their habitat, the researchers also related the physical and chemical properties of the soil to obtain more accurate and detailed results regarding the environmental characteristics of the pranajiwa's habitat in the two study locations. The soil in the observation plots of pranajiwa has a granular structure. Soils with a granular or crumbly structure have a higher porosity than soils with a *massive* (solid) structure [3]. Soil with high porosity has a better rate of water absorption, but the capacity to store water is low so that the nutrient content tends to be low. The pH conditions at the two observation locations were slightly acidic, but this did not inhibit the growth of pranajiwa. In addition, the C-organic content of the soil in pranajiwa's habitat was in the high-very high category. This condition has an important role in storing water and nutrients that are needed by plants. The Cation Exchange Capacity (CEC) of the soil at the study site is in the high category. CEC is one of the soil chemical properties that is closely related to the availability of nutrients for plants and is an indicator of soil fertility.

According to the reviewer, the results of the journal author's analysis of the characteristics of pranajiwa's habitat in Bali and Lombok play an important role in determining conservation strategies and efforts in the area in the future. The author also does not only use environmental data from observations in pranajiwa's habitat plots, but also adds the condition of the physical and chemical characteristics of the soil. The physical and chemical properties of soil play an important role in determining the characteristics of a research location (habitat of a species). However, what the reviewers highlighted from the results of the above analysis was the dualism between the data on soil structure with high porosity and the data on C-organic content and CEC. The results of the analysis of soil structure at the study site stated that the ability of the pranajiwa habitat's soil to store water was low so that its nutrient content tended to be low, while based on data on C-organic content and CEC, the ability of the research location's soil to store water and nutrients tended to be high.

B. The Abundance and Distribution of Pranajiwa

The results of pranajiwa exploration and inventory in Bali and Lombok in the form of species abundance, height, and diameter of pranajiwa are presented in Table 2.

Table 2 Abundance, plant height, and average pranajiwa diameter

Location	Number of observation plots	Total number of individuals	Average number of individuals	Average plant height (cm)	Average diameter(cm)
Bali	12	481	40	63,8	0.6
Lombok	8	104	13	49.94	0.49

Based on the results of the author's data analysis, it was found that the abundance of pranajiwa in Bali is greater when compared to the abundance in Lombok. This is because the soil conditions in Bali are better than pranajiwa's habitat in Lombok so that they can provide better growing conditions. Apart from the different soil conditions in the two locations, the community's view of the existence of this plant in nature also had an influence on the difference in abundance in the two study locations (Bali and Lombok). Pranajiwa in Bali is still considered mystical, whereas in Lombok it is not. According to the myth in Bali, pranajiwa is food for guardian tigers around temples so that the existence of pranajiwa will be better maintained [4].

The pranajiwa distribution pattern in Bali and Lombok is clustered as indicated by the value of the distribution pattern > 1 (Table 3). In both locations, it was found that although the pranajiwa grew far apart, individually they were still in groups with a minimum number of 5 individual pranajiwa in the observation plots both in the shade and in the open. The existence of an individual at one point will increase the chances of another individual at another point in the vicinity. From this process it can form clustered patterns because it reproduces with seeds that fall close to the parent or rhizomes which can produce vegetative tillers that are still close to the parent [5].

Table 3 The pattern of pranajiwa distribution in Bali and Lombok

Location	The value of pranajiwa distribution patterns	The distribution pattern of pranajiwa
Bali	4	group
Lombok	3	group

Based on the results of an analysis of the abundance and distribution of pranajiwa in Bali and Lombok, the reviewers suggest that in subsequent studies, the authors need to pay attention to the involvement of the community in the location of pranajiwa's habitat. Researchers also really need to explore in more detail regarding the specific benefits of this medicinal plant so that it can be disseminated to the public. Communities can also be partners in conservation efforts, for

example by designing an ecotourism program around pranajiwa's habitat. Reviewers hope that with this ecotourism program, the preservation of this species can be better maintained and its abundance will increase in nature.

C. Pranajiwa Habitat Environmental Factors

Variable environmental conditions where pranajiwa grow has an influence on the existence of pranajiwa in its natural habitat. Environmental factors that have a high influence determine the suitability of places to grow plants as the basis for pranajiwa domestication efforts. The domestication of pranajiwa through cultivation techniques is expected to reduce the dependence of the community on harvesting pranajiwa from nature. In this study, the *Principal Component Analysis* (PCA) method was used to determine the correlation between variables, determine the main components, and to reduce variable dimensions so that the most influential variables could be determined.

The results of PCA analysis show that slope, temperature, and altitude are environmental factors that affect mental health in Bali and Lombok. Altitude and slope are often used as indirect representations of species or vegetation distribution [6], especially in mountainous habitats [7]. These topographical characteristics contribute to the spatial differences in local temperature, rainfall, and soil properties, which play an important role in vegetation growth and affect the spatial distribution of vegetation [8,9]. Altitude and slope also have an important role hydrologically in controlling runoff and erosion processes that affect the distribution of soil properties, especially on hillsides [10,11]. Other studies have also found that site elevation and slope are correlated with soil nutrient distribution and water availability [12,13], thereby influencing the pattern of distribution and abundance of a species.

The dominant environmental variables in the pranajiwa habitat in Bali (74.54%) and Lombok (80.33%) indicate that the dominant variable can explain more than 50% of the variability of the variables analyzed. The dominant variable can be used as a basis for efforts to develop pranajiwa outside its habitat. The benefits of knowing the dominant variable biophysical conditions of pranajiwa habitat can also be used as information on the characteristics of places where pranajiwa grow, especially in Bali and Lombok. Therefore, if pranajiwa is to be cultivated outside its natural habitat, as much as possible the conditions of the planting area are the same or close to those of its habitat.

5 Conclusion

Pranajiwa in Lombok National Park grows in hilly areas with rather steep slopes, altitudes > 1,200 m above sea level, temperatures of 21°C, humidity of 80%, and slightly acidic soil pH. Pranajiwa in CAB Bali grows in hilly areas with steep slopes, altitudes > 1,400 m above sea

level, temperatures of 20°C, humidity of 80%, and slightly acidic soil pH. Location 1 CAB Bali The pranajiwa population lives in groups and their presence is influenced by temperature and slope. The location of 2 TNGR Lombok is influenced by the slope and elevation of the place . Further research related to pranajiwa exploration in other locations where there are indications of pranajiwa and pranajiwa cultivation using the latest technology is important to do to support conservation efforts and their sustainable use. This ecological information reveals pranajiwa's habitat preference as a supporting factor for its conservation efforts.

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