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Study Population and Characteristic Habitat of Grizzled Leaf Monkey (*Presbytis comata* Desmarest, 1822) in Gunung Botol Resort, Gunung Halimun Salak National Park

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ABSTRACT

The grizzled leaf monkey (*Presbytis comata*) is a protected endemic species of West Java based on the Regulation of the Minister of Environment and Forestry Number P.106/MENLHK/SETJEN/KUM.1/12/2018 concerning Protected Plant and Animal Species. The research was conducted in May-June 2022 in the Gunung Botol Resort, Gunung Halimun Salak National Park. This research aims to identify population numbers and characteristics of the grizzled leaf monkey's habitat. This research was carried out by observation using the modified line transect method. There were 21 grizzled leaf monkey individuals consisting of 19 individuals from five groups and two solitary individuals. The distribution of meeting points is at an altitude between 1.119-1.292 masl. The population density in the three blocks ranges from 12.5 to 60 individuals/km². The estimated grizzled leaf monkey population at the Gunung Botol Resort is 785 individuals. The group size of grizzled leaf monkeys ranges from 2-6 individuals. The age structure of grizzled leaf monkeys showed a value of 42.86% for the adults and 28.57% for the pre-adult and adolescents. The results of measurements of temperature obtained an average of 19.90-21.60°C with an air humidity of 71.87-90.51%. The slope of the research block ranges from 25-40%, and the altitude ranges from 1.119-1.292 masl. The diversity of vegetation types in the Gunung Botol Resort was found in 98 species and 43 families. The tree-level vegetation type that has the highest Importance Value Index is the ki merak (*Eura javanica*) at 105.69%. There were 15 species of grizzled leaf monkey fodder trees identified from 11 families. There are 6 species of grizzled leaf monkey sleeping trees identified and come from 4 families.

Keyword: Density, Grizzled leaf monkey, Gunung Botol Resort, Habitat, Population

1. Introduction

Indonesia has a high level of primate diversity and is endemic because the existence of islands in Indonesia supports primate life. It has been proven as many as 59 species from 11 primate genera are found in Indonesia and inhabit various natural habitats [1]. Grizzled leaf monkey (*Presbytis comata* Desmarest, 1822) is a type of Indonesian primate that is endemic to western Java, spread from Banten Province, West Java to Central Java [2]-[4].

The Indonesian government has designated the grizzled leaf monkey as a protected animal through Minister of Environment and Forestry Regulation Number P.106/ MENLHK/ SETJEN/ KUM.1/ 12/ 2018 concerning Protected Types of Plants and Animals. Grizzled leaf monkey has conservation status as Endangered in the IUCN category and is included in Appendix II in the CITES category [5]. The biggest threat to the sustainability of the grizzled leaf monkey population is caused by several factors [6]. According to [7], grizzled leaf monkeys experience disturbances such as population decline and habitat loss caused by human activities such as hunting, destroying habitat, and polluting the environment.

The grizzled leaf monkey is one of the animals included in the keynote species. Keystone species are species that are important in the structure/role, function, or productivity of a habitat or ecosystem (habitat, soil, and seed dispersal) [8]. Gunung Botol Resort is located in the Gunung Halimun Salak National Park (*Taman Nasional Gunung Halimun Salak/TNGHS*) with an area of ±3,000 ha and has physical and biotic conditions that are very supportive for the survival of various types of fauna, including grizzled leaf monkey [9]. The existence of the grizzled leaf monkey as a key species is not yet supported by complete population data. Therefore, research regarding the grizzled leaf monkey population and habitat studies is very important to carry out as basic information to support integrated regional management.

2. Materials and Methods

2.1 Tools and Materials

This research was carried out in the Gunung Botol Resort, TNGHS. The research period was carried out for one month (May-June 2022). The tools and materials used to support the collection of data required for this research are a map of the Gunung Botol Resort, TNGHS (-6.723783º S, 106.481795º E), stationery, camera, binoculars, GPS, compass, wet and dry thermometer, clinometer, hagameter, measuring tape, rope and tape measure, tally sheet, and laptop.

2.2 Data Collection Techniques

2.2.1 Determination of observation routes

Determining the research location was carried out using initial observations guided by key informants and based on information from the local community. Observations of the grizzled leaf monkey population were carried out using a modified line transect method [10]. Five transect routes were made in three different blocks, namely two routes in the Ciwalen Block, one route in the Hanjawar Block, and two routes in the Gunung Malang Block with route lengths ranging from 1-3km (Figure 1). The width of the observation track is 50m on both sides of the track [11]. The distance between transects varies, but the minimum is around 500 meters [12].

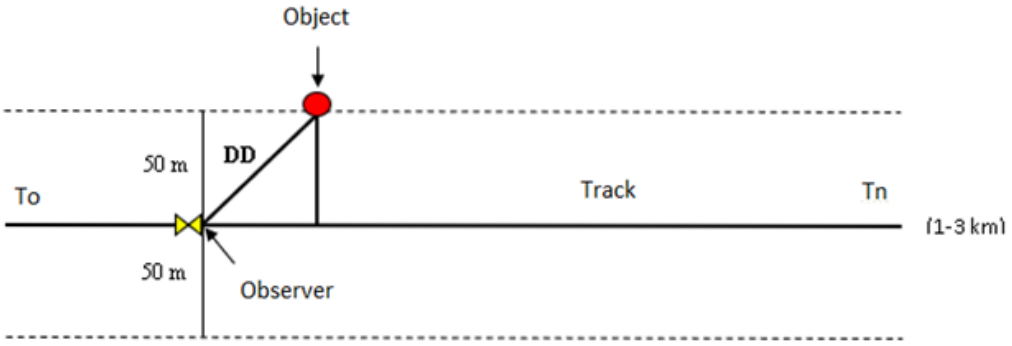


Figure 1. The shape of transect route of the grizzled leaf monkey observation

Data collection is carried out by tracing each path from the starting point (To) to the endpoint of the path (Tn) and repeating from the endpoint (Tn) to the starting point of the path (To). Observation times were carried out in the morning at 06.00-10.00 WIB and in the afternoon at 14.00-18.00 WIB [13].

2.2.2 Identify the existence of grizzled leaf monkey

The existence of grizzled leaf monkeys can be identified through direct and indirect encounters. Recording data on direct encounters includes, among other things, the number of individuals and group composition, the distance from the observer's position to the position of the grizzled leaf monkey individual first seen (direct distance), activity, encounter coordinates using GPS, meeting time, type of tree, location of the grizzled leaf monkey on the observation route, composition age and gender, as well as weather [14]. Furthermore, [15] explained that the classification of grizzled leaf monkeys found was based on the age groups of adult females, adult males, pre-adult females, pre-adult males, juveniles, and babies. Indirect data recording of encounters includes, among other things, sounds, droppings, food marks, distance between the observer and identified findings, encounter time, encounter location, and coordinates of the encounter location.

The possibility of double counting can be avoided by doing several things, namely identifying the shape and special characteristics of each individual, taking pictures of each individual found, and then identifying them according to the characteristics of each individual, the distance between transects influences the

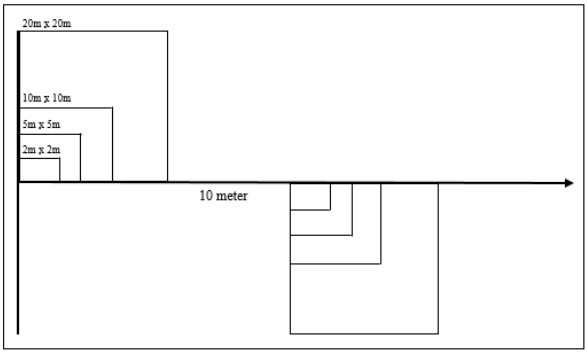
calculation. double and the minimum distance used is 500 m, as well as repeated observations every day in the morning and evening.

2.2.3 Measurement of abiotic components

Abiotic components observed include temperature, humidity, slope, and altitude. Temperature and humidity measurements were carried out using a wet and dry thermometer at each observation. Slope measurements were carried out using a clinometer, and altitude measurements were carried out using an altimeter on the Garmin GPSmap 62s.

2.2.4 Measurement of Biotic Components

The biotic components observed include vegetation composition and species diversity, as well as food trees and sleeping trees. Vegetation data collection was carried out using the plotted line method [16]. There were 25 sample plots made in five transect lines in three observation blocks. The distance between plots on each path is 10 m (Figure 2).



Information :
- Sample plot for seedling level with an area of 2 x 2 m.
- Sample plot for sapling level with an area of 5 x 5 m.
- Sample plot for pole level with an area of 10 x 10 m.
- Sample plot for tree level with an area of 20 x 20 m.

Figure 2. Illustration of Vegetation Observation Plot

The introduction of vegetation is accompanied by field officers as species identifiers. Tree level measurements are carried out by measuring the height of each tree using a hagameter. Diameter data was obtained by measuring the circumference of the tree using a measuring tape meter, then the tree circumference value was converted to diameter. The identification of food and sleeping tree types refers to [17].

2.3 Data analysis

2.3.1 Population density and estimates

States [18] that the equation that is often used to estimate the population density of a type of primate based on the path transect method is the King equation (King Methods). The equation for estimating density and estimating primate populations is below.

$$d = \frac{N}{2XD} \quad (1)$$

$$EP = \frac{NA}{2XD} \quad (2)$$

Information:
d = Density
N = Total individuals detected during observation
X = Observation path length
D = Distance between the target primate when first detected and the observer (average)
A = The total area to be estimated
EP = Estimation of Population

2.3.2 Population structure

The global sex ratio is obtained by comparing the number of males with the number of females. The age structure is obtained by counting and grouping the number of adult, pre-adult, and juvenile individuals [19]. The equation used to determine the structure of the grizzled leaf monkey population is:

$$S = \frac{M}{F} \quad (3)$$

$$a_x = \frac{N_{(x)}}{N_{(total)}} \; x \; 100 \quad (4)$$

Information:
S = Sex ratio
M = number of males
F = number of females
ax = Age structure
$N_{(x)}$ = Number of individuals in age class x
$N_{(total)}$ = Total number of individuals

2.3.3 Vegetation analysis

The data was calculated for analysis of density and relative density, frequency and relative frequency, basal area (BA), dominance and relative dominance, as well as the important value index (IVI) [20].

- Density (d) and Relative Density (Rd)

$$d = \frac{\Sigma \; individual \; species}{sample \; plot \; area} \quad (5)$$

$$Rd = \frac{K \; value \; of \; species}{K \; value \; of \; all \; species} \; x \; 100\% \quad (6)$$

- Frequency (F) dan Relative Frequency (RF)

$$F = \frac{\Sigma \; sub \; plot \; found \; a \; species}{\Sigma \; all \; plot} \quad (7)$$

$$RF = \frac{F \; a \; species}{F \; all \; species} \; x \; 100\% \quad (8)$$

- Dominance (D) and Relative Dominance (DR)

$$D = \frac{Species \; basal \; area}{Sample \; plot \; area} \quad (9)$$

$$RD = \frac{D \; a \; species}{D \; all \; species} \; x \; 100\% \quad (10)$$

- Basal Area (BA)

$$BA = \pi \; x \; (\frac{diameter \; of \; tree}{\int^2}) \quad (11)$$

- Importance Value Index (IVI)

$IVI = FR + KR + DR$ (poles and trees) (12)

$IVI = FR + KR$ (seedling and sapling) (13)

The diversity of vegetation types can be analyzed using the Shannon-Wiener diversity index (equation 14):

$$H' = -\sum_i^s \left[\left(\frac{ni}{N}\right) \ln \left(\frac{ni}{N}\right) \right] \quad (14)$$

Information:
H’ = Shannon Wiener’s Diversity Index
S = Number of tree species
ni = Number of tree species i
N = The total number of individuals found

The diversity index criteria according to Shannon-Wiener are 1) -H’<1 means Low level of species diversity; 2) 1< H’<3 means Medium level of species diversity, and 3) H’>3 means High level of species diversity.

3. Result and Discussion

3.1 Grizzled Leaf Monkey Population

The grizzled leaf monkey population found at the Gunung Botol Resort numbered 21 individuals, with a distribution of 13 individuals in the Ciwalen Block, 6 individuals in the Hanjawar Block, and 2 individuals in the Gunung Malang Block (Table 1).

Table 1. Group Size, Group Composition, and Grizzled Leaf Monkey's Population Density

Location	∑ Group or Individual	Group Size	Group Composition			Population Density	
			Adult	Pre-Adult	Juvenile	Individual /km^2	Group /km^2
Ciwalen Block	1 group	6	3	2	1	29,89	9,20
	1 group	4	3	-	1		
	1 group	2	-	2	-		
	1 individual	1	-	-	1		
Hanjawar Block	1 group	5	3	-	2	60	20
	1 individual	1	-	-	1		
Gunung Malang Block	1 group	2	-	2	-	12,5	6,25
Total		21	9	6	6		
Estimated Population at Gunung Botol Resort						**785 individual**	

Observation of the grizzled leaf monkey was carried out from a distance far enough so that the surili did not feel disturbed. Thus, the use of aids in the form of binoculars and cameras is very necessary.

3.2 Population Distribution

There are seven distribution points for the grizzled leaf monkey population from five research lines spread across the Ciwalen Block, Hanjawar Block and Gunung Malang Block with the number of groups observed being five groups and two solitary individuals with a total grizzled leaf monkey population of 21 individuals. The grizzled leaf monkey population at Gunung Botol Resort is mostly found on the edge of the forest, at an altitude of between 1.160-1.270 masl. This is because the availability and distribution of food in this area are sufficient to meet their living needs. In line with [21] which states that the Javanese Grizzled leaf monkey is an animal that likes forest edge areas that border other land cover. Javanese Grizzled leaf monkey tends to be located on the edge of mountain forests or natural forests due to the abundance of varied food sources.

The largest grizzled leaf monkey population distribution is in the Ciwalen Block. This is thought to be related to forest management factors in the TNGHS area which influence food conditions and grizzled leaf monkey habitat safety factors. A high stand density level will make it easier for grizzled leaf monkeys to carry out daily activities, such as moving between trees. This was explained by [22] that grizzled leaf monkey is a type of primate that carries out most of its activities in trees (arboreal).

3.3 Population Structure, Population Density and Population Estimates

Grizzled leaf monkeys have varying group sizes and are generally relatively smaller compared to other primate species such as the Javan langur. This is influenced by the conditions of the grizzled leaf monkey habitat at each research location [3], [23]. The three research blocks at the Gunung Botol Resort are included in the utilization zone which is the forest around settlements (enclaves) and footpaths/shortcuts commonly used by residents, so this area has been disturbed by human activity and presence. [24] stated that habitat disturbance was one of the causes of differences in the size of the grizzled leaf monkey group.

In the Ciwalen and Hanjawar research blocks, two solitary grizzled leaf monkey individuals were found. It is suspected that the solitary grizzled leaf monkey has entered adolescence, which is the age that is mature enough to form a new group so that he will separate himself from his group to look for a partner. This condition is reinforced by the statement [25], that solitary grizzled leaf monkey individuals are a class of juveniles who deliberately separate themselves from their group because they want to find a partner from another group.

The grizzled leaf monkey sex ratio at the Gunung Botol Resort looks ideal for population growth, namely the ratio of adult males: to adult females (1:2). The greater number of females in one group is by the characteristics of the grizzled leaf monkey group described by [3], that grizzled leaf monkey is a primate group consisting of only one male as group leader and several females. Age structure is the ratio of the number of individuals in each age class of a population. Grouping individuals into age classes is very useful for assessing the development of population size. The results of the age structure data analysis for the grizzled leaf monkey population at Gunung Botol Resort are that the adult age class has a value of 42.86%, and the pre-adult and adolescent age classes have a value of 28.57%. The grizzled leaf monkey age structure in this study is known to have an increasing pattern, namely the youngest age class is larger than the adult age class. [26] states that the population has an age structure which can be broadly classified into three patterns, namely decreasing, stable and increasing structure.

The population density and grizzled leaf monkey group in the Ciwalen Block are 29.89 individuals/km² and 9.20 groups/km². The population density and grizzled leaf monkey group in the Hanjawar Block is 60 individuals/km² and 20 groups/km². The population density and grizzled leaf monkey group in the Gunung Malang Block are 12.5 individuals/km² and 6.25 groups/km² (Table 1). Differences in population density are influenced by the presence of food trees, sleeping trees, and vegetation conditions in each research block which supports grizzled leaf monkey mobility which usually moves from one tree to another (arboreal). In line with [7] who stated that the quantity and quality of habitat will determine the existence of wild animals.

As a comparison, using the same method, namely line transect, although using the same method in data collection techniques, this research uses a different technique from this research in calculating population density, namely as done by [27] in the Gunung Tukung Gede Nature Reserve with a population density of 4.3 individuals/km², [12] states that in the Lowland and Hill Forests Kuningan Regency with a population density of 44.9-85.36 individuals/km², and [24] in TNGHS with a population density in disturbed forest of around 8.25 individuals/km² and undisturbed around 23.38 individuals/km². The cause of this difference is not known with certainty whether it is due to differences in the use of counting techniques or differences in habitat quality.

The estimated population at Gunung Botol Resort shows a value of 785 individuals. Based on the results of this analysis, the estimated population value in this study shows that the grizzled leaf monkey population in the Gunung Botol Resort can still survive in several forest areas which are a combination of remaining lowland and hilly natural forests.

3.4 Threats and Disturbances to the Population

The difficulty in finding grizzled leaf monkeys in this research can be influenced by several factors suspected of threats and disturbances that can occur internally or externally. Threats and disturbances are internal or come from within their habitat, such as feed availability and the presence of predatory animals, namely the Javan leopard (*Panthera pardus*) as stated by field officers.

The grizzled leaf monkey food trees found at the Gunung Botol Resort are only 15 species of food trees (Table 3) out of a total of 98 tree species available (Table 2). The availability of food is not too much so it is suspected that this could affect the existing grizzled leaf monkey population. Furthermore, the presence of predators in a habitat acts as a balancer for an ecosystem and controls the population of prey animals. According to [28] predators are another ecological factor that is thought to influence the composition and size of wild animal groups. [29] states that populations of herbivorous mammals are influenced by a combination of food availability and predator pressure. The existence or frequent encounter of predators in a habitat indicates that in that habitat there are many prey animals. The large number of prey animals in a habitat indicates that the habitat is rich in food sources or also has physical components that are suitable for the needs of prey animals. So that in habitats that are frequently found or where predators and prey are present, the size of the group or population of a species can grow well.

Threats and disturbances that occur externally or come from outside their habitat, namely human activities. [24] states that the grizzled leaf monkey group always responds negatively to human presence. The Hanjawar Block is known to have a natural waterfall tourist attraction, namely Curug Piit. The activities of tourists can certainly disrupt grizzled leaf monkeys' daily activities because they are always alert to human presence [12]. The three observation blocks are also used as routine training areas for the Brimob Corps, so there are concerns that this could affect the grizzled leaf monkey population. This is because the exercise activities carried out can produce sounds that are loud enough to cause disturbances in grizzled leaf monkey activities and can even

lead to stress and fear. According to [30], stress is one of the factors that most determines group size in the Asian colobine type. Stress or pressure will interfere with the reproductive/mating process, reduce birth rates, and even cause susceptibility to disease.

At several points in the research block, areas were found that were bare or there were no types of vegetation at the level of seedlings and saplings growing around the area used as a training ground (Figure 5a). The type of vegetation at the seedling and sapling level is important for the regeneration and growth of trees that can support the survival of grizzled leaf monkeys, especially for the distribution of food trees and sleeping trees. Indirectly, this can affect the characteristics of the grizzled leaf monkey habitat at the Gunung Botol Resort, which can result in a population decline due to the habitat no longer supporting it. This is in line with [31], that grizzled leaf monkeys, like other primates, are animals that are very sensitive to changes in the environment around their habitat.

In the habitat where grizzled leaf monkeys were found, it was found that there was a lot of rubbish left behind. The presence of rubbish in the form of food scraps can cause changes in behavior towards grizzled leaf monkeys, especially in the behavior of looking for food sources. Ideally, the grizzled leaf monkey will explore a fairly wide daily home range in search of food sources. When the grizzled leaf monkey's habitat no longer supports it, the pile of rubbish will become a food source for the grizzled leaf monkey. Food from leftover waste can potentially infect grizzled leaf monkeys and other animals when consuming the food when carrying out grooming, or breathing the air around the waste and can transmit disease agents. Diseases caused by food from waste are due to the presence of disease-carrying agents. According to [32] the food conditions in the waste beds are full of parasites such as flies, protozoa, and worms. Apart from that [33] added that waste also contains other microorganisms such as mold and bacteria.

Suitable habitat for grizzled leaf monkeys is categorized based on consideration of internal and external factors [34]. It was further explained by [35], that internal factors are physiological needs that can influence where to live and find food. Meanwhile, external factors include external disturbances that can influence habitat preferences, such as the presence of predators and humans. A good habitat is a habitat that can support the needs of a species.

3.5 Habitat Characteristics

3.5.1 Abiotic components

The temperature measurement results obtained an average of 19.9-21.6°C with air humidity of 71.87-90.51%. During the research, the Gunung Botol Resort area always experienced rain, which affected the temperature and humidity conditions. The air temperature commonly used by mammals in tropical rainforests is 25°C [36]. Looking at the fact of the existence of grizzled leaf monkeys at a temperature of 19.9-21.6°C, this condition shows that there has been a change in the choice of temperature by grizzled leaf monkeys.

Grizzled leaf monkey is found in quite steep valley areas with steep slopes ranging from 25-40% with wavy to steep slope classes. This is in line with [37], which states that the presence of grizzled leaf monkeys is often found in fairly steep valleys with steep slopes (25-40%). Choosing grizzled leaf monkey habitat in areas with steep slopes is related to self-protection efforts to avoid predators or other disturbances.

The existence of grizzled leaf monkey is found at altitudes ranging from 1.119-1.292 masl. This altitude falls into the sub-mountain zone which has a fairly high level of biodiversity. In line with [17], that the distribution of the grizzled leaf monkey population in Gunung Ciremai National Park is more often found at an altitude of 1,000–2,400 masl, the increase in altitude is directly proportional to the grizzled leaf monkey encounters and then decreases at certain altitudes. The choice of grizzled leaf monkey for altitude is closely related to the abundance of food. Grizzled leaf monkeys tend to choose higher altitudes in sub-mountain and mountain forest types compared to lowland forest types, where in lowland areas the availability of grizzled leaf monkey food is lower, which is dominated by pine stands.

3.5.2 Biotic components

Vegetation analysis in Gunung Botol Resort shows the following results (Table 2).

Table 2. Amount of individulas, species, family, INP, and diversity index in Gunung Botol Resort

Block	∑ individuals	∑ species	∑ family	Highest INP	Diversity index (H')
Ciwalen	799	77	35	*Schima wallichi (60,72)*	3,12 (high)

Hanjawar	301	47	21	*Schima wallichi (85,26)*	2,79 (medium)
Gunung Malang	805	57	30	*Eura javanica (105,96)*	2,59 (medium)
Total	1905	98	43		

Vegetation analysis in the Ciwalen Block shows the dominance of the puspa (*Schima wallichii*) with the highest INP value of 60.72%. Puspa is a species of plant belonging to the Theaceae family which dominates the TNGHS area. Puspa is also a species of highland plant that can grow on critical land. Thus, it can restore mountain forests that are degraded by activities such as mining and encroachment [38]. This block has a species diversity index value of 3.12 in the high category or it could be said that the species diversity in this block is very good.

The results of vegetation analysis in the Hanjawar Block show the dominance of the puspa with the highest INP value of 85.26%. In this block, there is access to the Curug Piit Waterfall tourist attraction. However, the type of vegetation that dominates in this block is also diverse. This block has a species diversity index value of 2.79 in the medium category. It means the species diversity in this block is quite good.

The results of vegetation analysis in the Gunung Malang Block show the dominance of the ki merak (*Eura javanica*) with the highest INP value of 105.96 %. This block was previously one of the lands managed by Perum Perhutani. It can be seen that one of the species that dominates this block is the pine (*Pinus merkusii*) plantation. After it was no longer managed by Perum Perhutani, local people began to plant many types of vegetation. Therefore, the current vegetation condition of the Gunung Malang Block is no longer only dominated by pine but many other species dominate with high INP values. In this block, the species diversity index value is 2.59 in the medium category.

The difference in species diversity index values at the Gunung Botol Resort indicates disturbance. In this case, disturbances to vegetation stability are caused by internal and external factors. [39] stated that the higher the diversity of vegetation in an area, the more stable the condition of the vegetation in that area, while the lower the vegetation species in an area, the more vulnerable the condition of the area. Furthermore, in total 15 species of food trees were found from 11 families. Fagaceae is the family that dominates the distribution of grizzled leaf monkey food trees. Grizzled leaf monkey food tree vegetation data is presented in Table 3.

There are 15 species of food trees from 11 families. Fagaceae is the family dominated by grizzled leaf monkey which is used as a food tree. Types of trees belonging to the Fagaceae family at the Gunung Botol Resort include puspa (*Schima wallichii*), saninten (*Castanopsis argantea*), and pasang (*Litocharpus blume*). The choice of this tree species is thought to be because grizzled leaf monkeys like the tops of their leaves as a source of food. Grizzled leaf monkeys are also animals that are quite selective in the food available so they will eat more of the type of food they like most. [15] stated that grizzled leaf monkeys like green leaves, high water content, and softer leaf texture. This is in line with [23] which states that the composition of grizzled leaf monkey feed consists of 59.1% young leaves, 13.5% fruit, 7.0% flowers, 5.6% mature leaves, 4.1% mushrooms, 2.7% pseudobulbs, 1.5% branch tips, and 0.7% seeds.

Table 3. Species of Forage Trees

No	Species	Family	Edible Parts		
			Fruit	Leaf	Flower
1.	Limo *(Litsea cubeba)*	*Lauraceae*	√	√	
2.	Ki Dage *(Bruinsmia styracoides)*	*Styraceae*		√	
3.	Ki Pare *(Memecylon lilacinum)*	*Melastomateceae*		√	
4.	Nangsi *(Villebrunea rubescens)*	*Urticaceae*	√	√	
5.	Huru *(Litsea sp)*	*Lauraceae*		√	√
6.	Ki Huut *(Glochidion obscurum)*	*Euphorbiaceae*		√	
7.	Hamerang *(Ficus padana)*	*Moraceae*	√	√	
8.	Rasamala *(Altingia excelsa)*	*Alingiae*		√	
9.	Ki Sampang *(Evodia latifolia)*	*Rutaceae*		√	
10.	Puspa *(Schima wallichii)*	*Fagaceae*		√	
11.	Ki Merak *(Eura javanica)*	*Theaceae*	√	√	
12.	Saninten *(Castanopsis argentea)*	*Fagaceae*	√		√
13.	Pasang *(Lithocarpus blume)*	*Fagaceae*		√	
14.	Jirak *(Symplocos fasciculata Zoll)*	*Sympoloceae*	√	√	
15.	Mara *(Macaranga tanarius (L))*	*Euphorbeaceae*	√	√	

There are 6 species of sleeping tree vegetation from 4 families that are used by grizzled leaf monkey as beds (Table 4).

Table 4. Species of Sleeping Trees

No	Species	Family
1.	Saninten *(Castanopsis argentea A.DC)*	*Fagaceae*
2.	Pasang *(Lithocarpus blume)*	*Fagaceae*
3.	Puspa *(Schima wallichii)*	*Fagaceae*
4.	Beunying *(Ficus fistulosa)*	*Moraceae*
5.	Huru *(Litsea sp.)*	*Lauraceae*
6.	Ki Merak *(Eura javanica)*	*Theaceae*

Trees used as bedding are mostly close to food trees. [40] stated that the selection of sleeping trees in grizzled leaf monkeys is a food tree that is often consumed. Based on the results of this research, at the Gunung Botol Resort, there are six species of tree-level vegetation from four families which are used by grizzled leaf monkeys as sleeping trees. Species of trees used as sleeping trees include saninten (*Castanopsis argantea*), pasang (*Litocharpus blume*), puspa (*Schima wallichii*), huru (*Litsea angulata*), and beunying (*Ficus fistulosa*). According to [41], the characteristics of sleeping trees chosen by grizzled leaf monkeys are usually strong-sized trees with a canopy that is not too dense but horizontal branches that are quite strong and have lots of branches, this is done to make it easier to detect the threat of predator disturbance or other conditions danger.

4. Conclusion

The number of grizzled leaf monkey populations observed was 21 individuals. The grizzled leaf monkey population density in the three research blocks ranged from 12.5 to 60 individuals/km². The estimated grizzled leaf monkey population at Gunung Botol Resort is 785 individuals. Grizzled leaf monkey's age structure is for the adult class 42.86%, the pre-adult age class 28.57%, and the adolescent age class 28.57%. Characteristics of the grizzled leaf monkey habitat at Gunung Botol Resort obtained an average temperature of 19.90 - 21.60°C with air humidity of 71.87 - 90.51%. The slope ranges from 25-40%, and the altitude ranges from 1119-1292 masl. The diversity of vegetation species at Gunung Botol Resort was found to be 98 species and 43 families. The species of tree-level vegetation that has the highest Importance Value Index (IVI) is the ki merak (*Eura javanica*) at 105.96%. There are 15 species of Grizzled leaf monkey food trees identified and come from 11 families. There are 6 species of grizzled leaf monkey sleeping trees identified and they come from 4 families. The Shannon – Wiener Diversity Index (H') in the Ciwalen Block is 3.12 (high), the Hanjawar Block is 2.79 (medium) and the Gunung Malang Block is 2.59 (medium).

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