



Habitat and Population Structure of Javan Langurs (*Trachypithecus auratus auratus*) at Gunung Celering Nature Reserve, Jepara Regency Central Java

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Desember

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Lutung budeng, gunung celering, cagar alam

Abstrak

Banyak informasi yang disampaikan oleh masyarakat sekitar Cagar Alam Gunung Celering mengenai perjumpaan dengan Lutung budeng (*Trachypithecus auratus*). Penelitian tentang Lutung budeng (*Trachypithecus auratus auratus*) di Cagar Alam Gunung Celering yang terletak di Kecamatan Donorojo Kabupaten Jepara dilaksanakan pada 14-31 Agustus 2023. Penelitian ini bertujuan untuk mengetahui populasi Lutung Budeng, sebaran populasinya di Cagar Alam Gunung Celering dan untuk mengetahui jenis habitat dimana lutung Budeng tersebut ditemukan.

Selama pengamatan dijumpai 109 individu Lutung budeng dari 12 kelompok di 8 lokasi pengamatan yang berbeda. Dari 109 individu tersebut, menunjukkan bahwa 39% diantaranya merupakan Lutung budeng dewasa, 43% remaja dan 17% anak dengan kepadatan populasi 0,08 individu/ha dan sex rasio 1:1,5. Habitat Lutung budeng di CAGC terdiri dari 35 jenis pohon di lokasi pengamatan dengan 21 jenis diantaranya mempunyai potensi sebagai pakan.

Abstract

A lot of information has been conveyed by the people around the Gunung Celering Nature Reserve regarding encounters with the Javan Langurs (*Trachypithecus auratus auratus*). Research on the Javan langurs (*Trachypithecus auratus auratus*) in the Gunung Celering Nature Reserve which is located at Donorojo District, Jepara Regency was carried out on 14-31 August 2023. This research aims to determine the population of the Javan Langur, its population distribution at the Gunung Celering Nature Reserve and to find out the type of habitat where it is located the javan langur was encountered.

During the observations, 109 individuals of Javan Langur were encountered from 12 groups at 8 different observation locations. Of the 109 individuals, it showed that 39% of them were adult Javan Langurs, 43% were juveniles and 17% were children with a population density of 0.08 individuals/ha and a sex ratio of 1:1.5. The Javan Langur habitat at Gunung Celering nature Reserve consists of 35 tree species at the observation area and 21 of which have potential as javan Langur food.

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INTRODUCTION

Gunung Celering Nature Reserve (GCNR) is a conservation area under the management of the Pati Barat Conservation Forest Management Unit, Central Java Natural Resources and Conservation Agency (BKSDA Jateng). The area is 1,328 hectares, located in Donorojo District, Jepara Regency. GCNR is the largest area managed by the Central Java Natural Resources and Conservation Agency (BKSDA Jateng). The topography of CAGC is hilly with an altitude of 720 meters above sea level (BKSDA Jateng, 2023).

According to (Santoso et al., 2022), GCNR is geographically located in the same landscape as Mount Muria. At that time, Mount Celering and Mount Muria were located on a separate stretch of land from the island of Java. In 2009, it experienced quite worrying deforestation where more than 600 hectares of the area was occupied by the community and changed its function to community agricultural land. After being re-controlled, in 2012 reforestation efforts were carried out by replanting tree species which are native to GCNR.

One of the wild animals that people around GCNR often report encounters with is the Javan Langur (*Trachypitecus auratus auratus*). Javan langurs were found on the islands of Java, Bali, Kalimantan, Sumatra and Lombok. According to (Supriyatna & Wahyono, 2000), the distribution of this type can be grouped into three sub-species of langur. Its distribution is limited to western West Java, southeastern West Java and is spread across Bangka, Belitung, Riau Islands, East Kalimantan, South Kalimantan, southern Sumatra and also includes East Java, Bali and Lombok.

According to (Supriyatna & Wahyono, 2000) there are 2 types of Javan Langur, namely the West Javan Langur (*Trachypitecus auratus mauritus*) and the East Javan Langur (*Trachypitecus auratus auratus*). The distribution of the West Javan Langur is in the Cianjur area to the west, while the East Javan Langur is spread from the eastern part of West Java to East Java, Bali and Lombok. Javan Langurs are one of the protected animals according to Minister of Environment and Forestry Regulation No. 106/2018 and is on the IUCN red list as vulnerable.

The Javan Langur is different from the Long-tailed Monkey. The Javan Langur is relatively shy and avoids meeting humans. Long-tailed monkeys are more aggressive and tend to cause conflict because of their behavior. According to (Solihat & Bintarawati, 2020), the Javan Langur is an arboreal animal, (Supriyatna & Wahyono, 2000) stated that 50% of the Javan Langur's food source

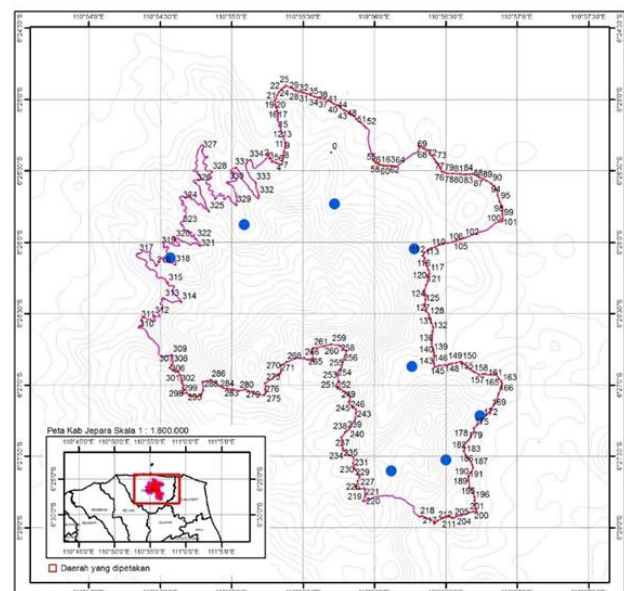
comes from leaves, 32% from fruit and the rest comes from insects. Thus, as an arboreal animal, the Javan Langur is very dependent on the condition of the vegetation in its habitat. Although at GCNR people often report encounters with Javan Langurs, but there is no data that shows how large the Javan Langurs population is in the area.

Within the framework of GCNR management, efforts are needed to look for information regarding the presence of Javan Langurs in the GCNR. The aim of this research are (1) to know the population of Javan Langurs, (2) to know the population distribution of Javan Langurs in GCNR and (3) to know the profile habitat where the Javan Langurs are encountered.

RESEARCH METHODS

The research was carried out on 14-31 August 2023 at 8 different locations in CAGC (see map of research locations). Langur observations are carried out twice a day, namely morning and evening. In the morning it will be held from 06.00 – 10.00 Western Indonesian Time and in the afternoon it will be held from 15.00 – 17.30 Western Indonesian Time. Apart from this, it is rest time for the Javan Langurs.

Figure 1. Map of the location of the Javan Langurs (*Trachypitecus auratus auratus*) research observation site at GCNR



Estimation of the Javan Langur population in GCNR was carried out using the concentration count method. This centralized method focuses on field observations. This means that observers go

directly to the field and determine the point to make observations, then determine the start and end times of the observation process. According to (Alikodra, 2002), this concentration method is suitable for calculating the population of Javan langurs which have a group life pattern. Counting the number of individuals in each group was carried out when the group was in the sleeping tree while resting. The coordinates of where the Javan Langurs rest in the tree were recorded using GPS. The location where the Javan langurs rest will show the number of groups and the distribution of the Javan langur groups. The Javan Langur population was calculated by counting the number of individuals encountered during the observation period. The Javan langurs that encountered were also identified with variations in age and sex.

The characteristics of the javan langurs habitat in GCNR are focused on the types of trees used by the Javan Langurs for food and activities. This was done considering that the Javan Langur is an arboreal animal. So recording the types of trees present at the observation location is important. For this reason, plots are used to observe the types of trees in question. Five plots were made at each observation location. Each plot includes; (a) 10x10 plot to calculate pole level, and (b) 20x20 plot to calculate tree level.

Data analysis was carried out descriptively quantitatively to calculate population size and density, age structure and sex ratio of Javan langurs. Population size and density are obtained by the following equation (Santosa et al., 2018) :

$$\text{Population size} = \sum xi$$

$$\text{Population density} = \frac{\sum xi}{A}$$

The age structure is calculated based on the percentage of the number of individuals in each age class (1) and based on the composition of the annual age structure (2) as per the following equation (Santosa et al., 2018) :

$$\text{Age structure} = \frac{\sum xi \times 100\%}{n} \quad (1)$$

$$= \frac{\sum xi}{\Delta t} \quad (2)$$

Meanwhile, the sex ratio is calculated using the equation: Sex ratio = Ji/Bi

Information :

- Σxi : number of ith individuals
- A : total area of observation area
- n : total number of individuals
- Δt : age interval
- Ji: number of males
- Bi: number of females

RESULTS AND DISCUSSION

Observations carried out at 8 locations showed the following Javan Langur encounters; there are 12 groups of Javan Langur, the smallest group consisting of 2 individuals and the largest group consisting of 22 individuals. The total number of encounters were 109 individuals, consisting of 43 adults (17 males, 26 females), 47 juveniles and 19 juveniles (see table 1).

Tabel 1. Number of Javan langurs encountered during observations

Station	Location	Group	Adult male	Adult female	Jouvenile	Bayi	Amount
1	Kalingasem, Banyumanis	1	1	1	2	1	5
		2	1	1	4	0	6
2	Kaliklakah, Banyumanis	3	1	2	5	0	8
		4	2	3	3	3	11
3	Gili Curi, Clering	5	1	1	6	0	8
		6	3	6	8	5	22
4	Kalikajar, Clering	7	1	2	5	0	8
		8	1	1	4	2	8
5	Kalikeyur, Ujungwatu	9	1	1	0	0	2
		10	1	1	3	3	8
6	Watu pondok, Sumberrejo	11	2	4	4	2	12
		12	2	4	4	2	12

No	Species	Observation site
28	Jambu mete	<i>Anacardium occidentale</i>
29	Kesambi	<i>Schleichera oleosa</i> 2 1 1
30	Bambu	<i>Bambusa sp.</i> 1
31	Pulai	<i>Alstonia scholaris</i> 1
32	Bendo	<i>Artocarpus elasticus</i> 1 1 1
33	Kemloko	<i>Phyllanthus emblica L</i> 1 1 1
34	Gondang	<i>Ficus variegata Blume</i> 2 1 1
35	Gintungan	<i>Bischofia javanica Blume</i> 1 1

Observation results showed that there were groups with only 2 members consisting of an adult male and female as well as groups consisting of 1 adult male and 1 adult female with several juveniles and children. According to (Leksono, 2014), this condition shows that there is the formation of a new group that originates from the separation of male juvenile langurs that are approaching adulthood. This is because there is competition to become group leader. Efforts to escape from the group are then supported by the joining of female juveniles who are approaching adulthood. The presence of 1 adult male and 1 adult female accompanied by several juveniles and children is evidence of the formation of a new group. According to (Supriyatna & Wahyono, 2000) Javan langurs have a body length from head to tungging, adult males and females average 517 mm, and their tail length averages 742 mm. Meanwhile, his average body weight is 6.3 kg. Hair color is black, interspersed with silvery tones. The ventral part is pale gray and the head has a crest. Newly born Javan Langur cubs are orange-yellow and do not have crests. As they grow older the color changes to gray black. The difference between male and female Javan langurs morphologically lies in the development of the genitals, while the age groups of Javan Langurs are differentiated based on body size and daily activities. Adult male langurs have a relatively large body size, while adult females have a body size that is smaller or almost the same as the adult male. The female Javan langur's back hair is blacker than the male Javanlangur's back.



Figure 4. Adult male Javan langur



Figure 3. A Juvenile Javan langur



Figure 4. Adult male Javan langur

At several observation locations, 6 of the 12 groups found showed more adult females than adult males (see table 3). The sex ratio value ranges from 1:1 to 1:2 with an average sex ratio value of 1:1.5. This fact shows that Javan langurs has a tendency towards polygamy. This is in accordance with the opinion of (Cannon & Vos,

n.d.) that the Javan langurs is an animal with polygamous characteristics. Calculation of the sex ratio of Javan langurs at the GCNR is only carried out in the adult phase considering the difficulty in differentiating the sex of the langurs in the juvenile and cubs phases.

Table 3. Javan langurs sex ratio at GCNR

Site	Location	Groups	Adult male	Adult female	Sex Ratio
1	Kalingasem, Banyumanis	1	1	1	1:1
		2	1	1	1:1
2	Kaliklakah, Banyumanis	3	1	2	1:2
3	Gili Curi, Clering	4	1	1	1:1
		5	2	3	1:1,5
4	Kalikajar, Clering	6	3	6	1:2
		7	1	2	1:2
5	Kalikeyur, Ujungwatu	8	1	1	1:1
		9	1	1	1:1
6	Watu pondok, Sumberrejo	10	1	1	1:1
7	Gunung Nangka, Jugo	11	2	4	1:2
8	Brangsong, Blingoh	12	2	3	1:1,5

The age structure of Javan langurs in GCNR shows 39% for adults, 43% for juveniles and 17% for cubs. From the encounters of 12 groups of Javan langurs at GCNR, 5 of them did not find the age structure of their cubs. These locations are in the Kalingasem, Kaliklakah, Gilicuri, Kalilumut and Kalikajar blocks. Meanwhile, the annual structure

of Javan langurs in GCNR shows the following values; adults 3.58, juveniles 11.75 and cubs 4.25 (see table 4).

Table 4. Javan langurs Annual age structure at GCNR

Age range	Range (Years old)	Range	Number of individu	Average
Adults	8-20	12	43	3,58
Juveniles	4-8	4	47	11,75
Cubs	0-4	4	17	4,25

The annual age structure of Javan langurs in GCNR shows a convex curve (3.58 - 11.75 - 4.25) where there is an increase from the adult to juvenile phase but then the value decreases in the juvenile phase (table 4). This condition needs to be watched out for because it is possible that the population may decline in the future. This is in

accordance with the opinion of (Santosa et al., 2008) where the population size in the juvenile phase will be directly proportional to the population of Javan langurs in the future assuming the death rate is at a constant level.

Table 5. The type of tree that is the habitat of Javan langurs activities in GCNR

No	Species		Location							
	Local name	Scientific name	1	2	3	4	5	6	7	8
1	Randu	<i>Ceiba pentandra</i>	√	√	√	√	√	√	√	√
2	Weru	<i>Albizia procera</i>	√	√	√	√	√	√	√	√
3	Jati	<i>Tectona grandis</i>	√	√	√	√	√	√		√
4	Beringin	<i>Ficus benjamina</i>		√	√	√			√	√
5	Lamtoro	<i>Leucaena leucocephala</i>	√			√			√	√

During observations of Javan langurs at GCNR there were not many types of trees that could be used as places to eat, play and rest. It was recorded that 5 main trees were used as locations for langurs to eat, play and rest at the same time. These trees are Teak, Brown albizia, ficus, giant Leucaena and Silk Cotton tree (see table 5). The preference of the javan langurs to carry out activities in these trees is probably for food reasons. When the observations were made, the trees were bearing fruit. In fact, Silk cotton tree and Brown albizia can be seen bearing fruit at almost all observation locations. The next reason may be because these trees are quite large trees at the observation location. According to (Zakki et al., 2017) Javan langurs in their habitat eat 15 different types of plants. The composition of the javan langur's food includes 50% leaves, 32% fruit, 13% flowers and the rest is other parts of plants and insects. Based on daily activities, according to (Faruq, 2017), the eating activity of Javan langurs takes up 48% of its share among other daily activities. Perhaps for that reason the movement of the javan langur in the GCNR is on the types of trees that are bearing fruit. For the types of trees used by the Javan Langurs in GCNR for food, there were 21 types of fruit and young leaves recorded (see table 6).

Table 6. Plants used as food by the Javan langurs at GCNR

No	Jenis	
	Nama Lokal	Nama ilmiah
1	Randu	<i>Ceiba pentandra</i>
2	Jrasah	<i>Ficus altissima</i>
3	Lamtoro	<i>Leucaena leucocephala</i>
4	Weru	<i>Albizia procera</i>
5	Kedoya	<i>Dysoxylum gaudichaudianum</i>
6	Beringin	<i>Ficus benjamina</i>
7	Sukun	<i>Artocarpus altilis</i>
8	salam	<i>Syzygium polyanthum</i>

No	Jenis	
	Nama Lokal	Nama ilmiah
9	Nangka	<i>Artocarpus heterophyllus</i>
10	Glingsem	<i>Homalium tomentosum</i>
	Jambu	
11	klampok	<i>Syzygium densiflora</i>
12	Awar-awar	<i>Ficus septica</i>
13	Pisang	<i>Musa sp</i>
14	Pete	<i>Parkia speciosa</i>
15	Mangga	<i>Mangifera indica</i>
16	Jambu mete	<i>Anacardium occidentale</i>
17	Kesambi	<i>Schleichera oleosa</i>
18	Bendo	<i>Artocarpus elasticus</i>
19	Kemloko	<i>Phyllanthus emblica L</i>
20	Gondang	<i>Ficus variegata Blume</i>
21	Gintungan	<i>Bischofia javanica Blume</i>

According to Click or tap here to enter text. (Mustari & Pasaribu, 2019), Javan langurs carry out feeding activities individually and in groups. The eating activity begins with looking for a food source, then taking leaves, fruit or seeds and then chewing them. During observations at GCNR, Javan langurs started their feeding activity by eating leaf shoots from various types of leaves and then continued by eating seeds from fruit, especially silk cotton tree's fruit and brown albizia tree fruit. These grains are a very good source of protein because according to (Kool, 1993) Javan langurs eat food sources that contain protein.

CONCLUDE

There were 109 individuals of Javan langurs from 12 groups at 8 observation locations. 39% of them were adults, 43% juveniles and 17% cubs with a population density of 0.08 individuals/ha and the sex ratio of 1:1.5. The Javan Langur habitat at GCNR consists of 35 tree species at the observation location, 21 of which have potential as food.

Within the the area and wildlife management, it would be best if the javan langur

population in the GCNR could be observed regularly. Furthermore, to complete the existing data, further research is needed regarding the behavior of the Javan langur.

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