

Javan Primates' Abundance and Distribution In the Mekarbuana and Sukasari, Mount Sanggabuana, West Java

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Abstract

Mount Sanggabuana is a limited production forest area with potential primate diversity in West Java. This study aims to determine the distribution and abundance of primates in the Mekarbuana area, Karawang, and Sukasari area, Purwakarta. The study was conducted in October–November 2024 in Mekarbuana and September 2025 in Sukasari using the Recce method, with a total of eight observation routes. Data collected included the number of individuals, groups, coordinate positions, and primate activity. The encounter rate was calculated as the number of individuals or groups per kilometer of route. The results showed that in Mekarbuana, 4 primate species were recorded, namely *Trachypithecus mauritius* with an abundance of 7.47 ind/km and a relative abundance of 67%, *Presbytis comata* with an abundance of 2.36 ind/km and a relative abundance of 21%, *Hylobates moloch* with an abundance of 0.98 ind/km and a relative abundance of 9%, and nocturnal primate *Nycticebus javanicus* with an abundance of 0.39 ind/km and a relative abundance of 4%. In Sukasari area, 3 species were recorded, namely *Trachypithecus mauritius* with an abundance of 2.75 ind/km and a relative abundance of 89%, *Hylobates moloch* with an abundance of 0.23 ind/km and a relative abundance of 5%, and *Nycticebus javanicus* with an abundance of 0.23 ind/km and a relative abundance of 6%. *Trachypithecus mauritius* was the dominant species in both locations. Differences in primate abundance in both locations were influenced by food availability, vegetation structure, and the level of habitat disturbance. This research provides baseline data for primate conservation management on Mount Sanggabuana.

Keyword: Abundance, Distribution, Javan Primates, Mount Sanggabuana



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INTRODUCTION

Indonesia has more than 64 primate species spread across Sumatra, Java, Kalimantan, Sulawesi, Bali, Nusa Tenggara, and the surrounding areas (Roos et al., 2014; Supriatna, 2022). Primates are highly evolved mammals, characterized by large brain volume and developed cognitive

abilities (Rahmah et al., 2021). Based on morphology, primates are divided into two main groups: apes (without tails, large bodies, solitary) and monkeys (with tails, smaller bodies, living in groups). Furthermore, based on their activity time, primates are classified into diurnal (active during the day) and nocturnal (active at night) (Alenta, 2021).

The ecological role of primates is crucial in maintaining the balance of forest ecosystems, particularly as seed dispersal agents that contribute to forest regeneration (Triandika et al., 2020). Primates also play a role in pollination and insect population control (Lambert & Garber, 1998). Unfortunately, much of Indonesia's primate habitat is degraded due to deforestation, land conversion, and illegal wildlife hunting and trade (Prasetyo & Sugardjito, 2010). This situation threatens the survival of many primate species, including endemic ones.

Conservation efforts are carried out through various regulations, such as the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) since 1973 and Law No. 5 of 1990 concerning the Conservation of Biological Natural Resources and their Ecosystems (Hanif, 2015). At the national level, the Minister of Environment and Forestry Regulation No. P.106/MENLHK/SETJEN/KUM.1/12/2018 also designates several primates as protected animals, including the Javan primates: javan gibbon (*Hylobates moloch*), javan surili (*Presbytis comata*), javan langur (*Trachypithecus mauritius*) and javan slow loris (*Nycticebus javanicus*).

Mount Sanggabuana, located on the border of Karawang, Purwakarta, Cianjur, and Bogor Regencies, is one of the areas with the potential for primate diversity on Java Island. This area has production forest status with an altitude reaching 1,291 meters above sea level (Riyadi, 2018). Several primate species have been recorded in this area, including the javan gibbon (*Hylobates moloch*), the long-tailed macaque (*Macaca fascicularis*), the javan langur (*Trachypithecus mauritius*), the javan surili (*Presbytis comata*), and the javan slow loris (*Nycticebus javanicus*). Meanwhile, research exploration related to the population and distribution of primates on Mount Sanggabuana is still limited. This area is experiencing pressure from human activities, which have the potential to disrupt primate habitats (Basalamah et al., 2010).

This study aims to determine the distribution and abundance of primates in the Mekarbuana and Sukasari areas of Mount Sanggabuana, West Java. Information on the encounter rate, relative abundance and the distribution of primates in this area is expected to provide baseline data for future primate conservation and habitat management efforts.

METHOD

This research was conducted in two different locations on Mount Sanggabuana. The first location was conducted in the Mekarbuana section, Karawang Regency on October 30 - November 3, 2024 with 2 diurnal observation routes, namely Kejayaan 2 hours (1 km) and Kejayaan burahol (1 km) and 4 nocturnal observation routes, namely Pandedomas (0.9 km), Cisea (0.54 km), Curug Cigentis (0.3 km), and Jayanti (1 km) (Figure 1). Meanwhile, the second location was conducted in the Sukasari section, Purwakarta Regency on September 21 - 25, 2025 with 2 diurnal observation routes, namely Batu Sereuh (1.2 km) and Batu Kutu (1.4 km) and 2 nocturnal observation routes, namely Pasir Bago (0.593 km) and Cimata Sereuh (1.1 km) (Figure 2).

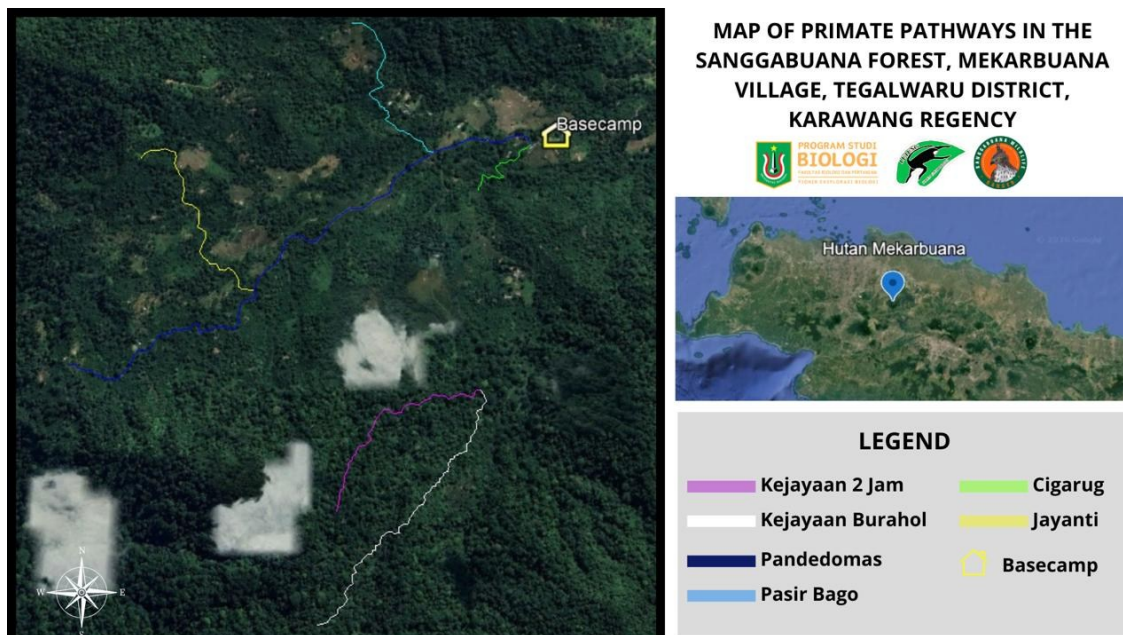


Figure 1 Location Map in Mekarbuana, Karawang (Google Earth Pro)

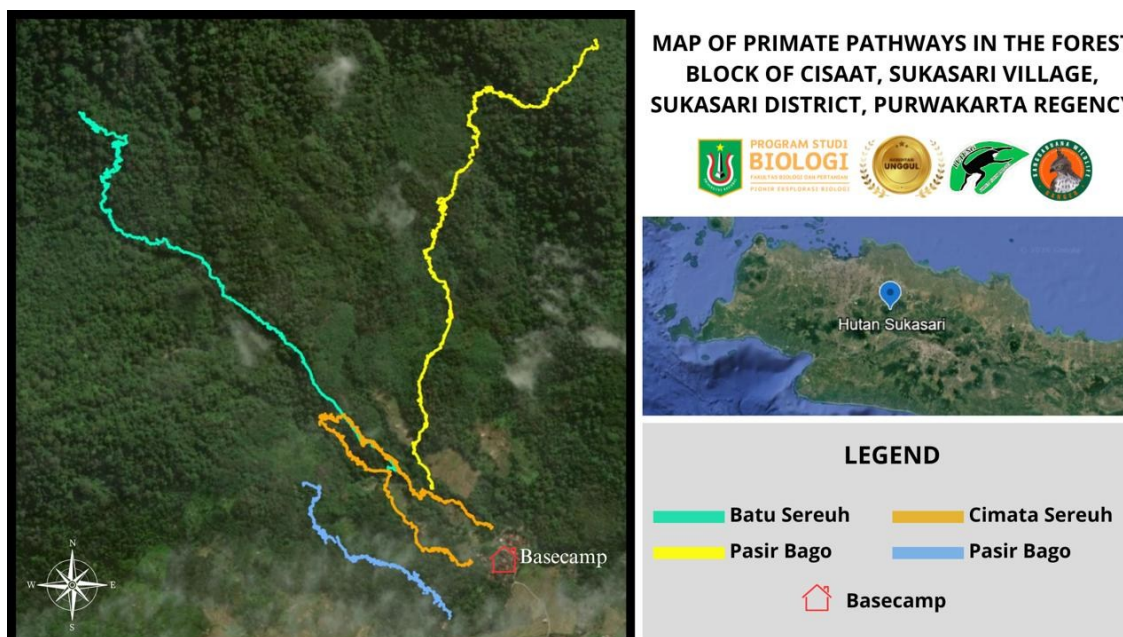


Figure 2 Location Map in Sukasari, Purwakarta (ArcGIS and Google Earth)

We used Recce method for survey the primates. Observations were conducted under two conditions: diurnal and nocturnal. Diurnal observations began at 6:00 AM - 2:00 PM, and nocturnal observations from 8:00 PM - 12:00 PM. Observations were conducted along each designated route, repeating the same route three times in three different days. We recording any primate sightings or sounds along the path. Data collected includes populations and fruiting plants (fruit trails/plants bearing fruits).

Population data observed and recorded in tabulations include information on the type of primate, number of individuals, time and interval of encounters, coordinate points of encounter locations, length of observation paths, perpendicular distance (pre-perpendicular distance/PPD), direct distance (DD), distance between the primate and the observer, type of primate tree seen, and tree height. Meanwhile, observations of fruiting plants include the name of the fruit, the condition of the fruit when found, the type of fruit, encounter interval, and time of encounter. In addition, the coordinate points of the start and end of the path, observation time, and additional notes using the ad libitum method were also recorded to complete the observation data.

Data analysis

a. Encounter Rate

The encounter rate describes the number of individuals and groups of primates encountered per unit length of observation path. The formula used is as follows:

$$ER = \frac{n}{L}$$

- ER = Encounter Rate (encounter rate; individual/km and group/km)
- n = number of individuals or groups encountered
- L = total length of observation path (km)

b. Relative Abundance

Relative abundance is used to determine the proportion of each primate species to the total number of individuals found during the study. The formula used is as follows:

$$KR = \frac{Ni}{N} \times 100\%$$

- KR = relative abundance (%)
- Ni = number of individuals of species i
- N = total individuals of all species found

RESULT

Based on observations at both survey areas, four primate species were recorded in the Mekarbuana area: the javan langur or lutung (*Trachypithecus mauritius*), the javan gibbon or owa (*Hylobates moloch*), the javan surili (*Presbytis comata*), and the javan slow loris or kukang

(*Nycticebus javanicus*). Meanwhile, three species were recorded in the Sukasari area, same as in Mekarbuana, except no surili.

At the Mekarbuana site, *Trachypithecus mauritius* was recorded as many as 38 individuals in total with an estimated species abundance of 7.47 individuals/km and 0.59 groups/km. For *Hylobates moloch*, 5 individuals with an estimated species abundance of 0.98 individuals/km and 0.20 groups/km. *Presbytis comata* was found 12 individuals only in Kejayaan Burahol route with an estimated abundance of 2.36 individuals/km and 0.20 groups/km. Meanwhile, *Nycticebus javanicus* was only found on the Pandedomas and Cisea routes, each with 1 individual, but no individuals were found on the Curug Cigentis, Jayanti, and Kejayaan routes. At the Sukasari site, *Trachypithecus mauritius* was found on the Batu Sereuh and Batu Kutu trail as many as 14 individuals with an estimated abundance of species in Sukasari of 2.75 individuals/km and 0.68 groups/km. *Hylobates moloch* was only found on the Batu Sereuh trail as many as 1 individual with an estimated abundance of 0.23 individuals/km. *Nycticebus javanicus* was recorded only in the Pasir Bago trail as many as 1 individual with an estimated abundance of 0.23 individuals/km (see Table 1).

Table 1. Encounters and Encounter Rate per route

Location	Primate Species	Trail Name	Number of Ind	Number of Group	ER Ind/km	ER Kel/km	ER Loc. Ind/km	ER Loc. Kel/km
Mekarbuana	<i>Trachypithecus mauritius</i>	Kejayaan dua jam	23	3	23	3	7.47	0.59
		Kejayaan Burahol	15	1	15	1		
	<i>Hylobates moloch</i>	Kejayaan dua jam	3	1	3	1	0.98	0.20
		Kejayaan Burahol	2	1	2	1		
	<i>Presbytis comata</i>	Kejayaan dua jam	0	0	0	0	2.36	0.20
		Kejayaan Burahol	12	1	12	1		
	<i>Nycticebus javanicus</i>	Pandedomas	1	1	1.11	1.11	0.39	0.39
		Cisea	1	1	1.85	1.85		
		Curug Cigentis	0	0	0	0		
		Jayanti	0	0	0	0		
Kejayaan		0	0	0	0			
Sukasari	<i>Trachypithecus mauritius</i>	Batu Sereuh	12	2	9.51	1.58	2.75	0.69
		Batu Kutu	4	1	2.85	0.71		
	<i>Hylobates moloch</i>	Batu Sereuh	1	1	0.79	0.79	0.23	0.23
		Batu Kutu	0	0	0	0		
	<i>Nycticebus javanicus</i>	Pasir Bago	1	1	1.69	1.69	0.23	0.23
	Cimata Sereuh	0	0	0	0			

Based on the encounter rate values in Table 1, *Trachypithecus mauritius* had the highest ER at both sites, indicating that this species was the most abundant and easily encountered compared to other species. Relative abundance indicates the proportion of each species to the total number of individuals encountered. Figures 3 and 4 show that *Trachypithecus mauritius* dominated at both study sites with a relative abundance of 67% in Mekarbuana and 89% in Sukasari. *Presbytis comata* was only recorded at Mekarbuana with a relative abundance of 21%. *Hylobates moloch* had a relative abundance of 9% in Mekarbuana and 6% in Sukasari. Meanwhile, *Nycticebus javanicus* had a lowest abundance at both sites, at 4% in Mekarbuana and 6% in Sukasari.

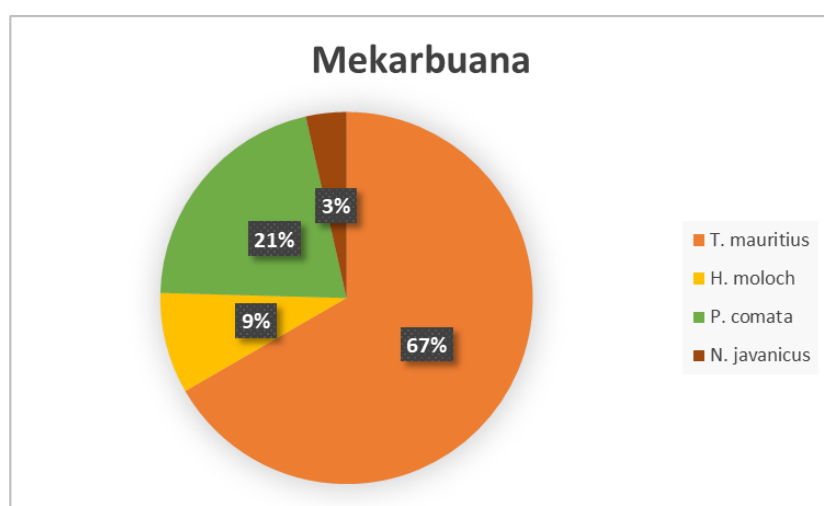


Figure 3. Relative Abundance (%) of Primates in Mekarbuana

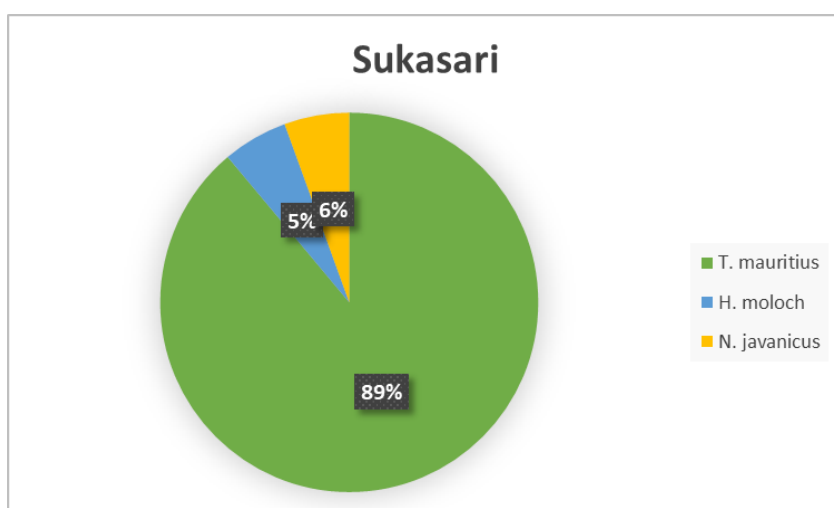


Figure 4. Relative Abundance (%) of Primates in Sukasari

DISCUSSION

Trachypithecus mauritius was the most abundant species in both study sites with the highest encounter rate (Mekarbuana: 7.47 ind/km; Sukasari: 2.75 ind/km) and the highest relative

abundance (Mekarbuana: 67%; Sukasari: 89%). These results are consistent with research by Kool (1993) and Hansen *et al.* (2020) which showed that the Javan langur has high ecological flexibility and is able to adapt to various habitat types, including secondary forests and disturbed areas. The Javan langur is known as a folivore with the ability to digest young and old leaves through a specialized digestive system equipped with enlarged salivary glands and a segmented stomach (Kool, 1992, 1993).

The high abundance of *Trachypitecus mauritius* in Sukasari (89%) compared to Mekarbuana (67%) indicates a difference in habitat quality between the two locations. According to Nijman (2013) and Wardhana *et al.* (2022), the availability of diverse food vegetation, especially from the Moraceae, Fabaceae, and Euphorbiaceae families, is an important factor supporting the existence of Javan langurs. The lower abundance in Mekarbuana is likely due to competition with *Presbytis comata*, which has an overlapping ecological niche as a fellow folivore (Supartono *et al.*, 2016).

Presbytis comata only recorded in Mekarbuana with a relative abundance of 21% and an abundance of 2.36 individuals/km, especially on the Kejayaan Burahol trail. The absence of *Presbytis comata* on the Kejayaan trail (2 hours) indicates an uneven distribution within the Mekarbuana area. The Javan surili is a primate endemic to West Java that is categorized as Endangered by the IUCN with an estimated population of less than 2,500 adult individuals (Nijman & Richardson, 2008). This species is a specialist folivore that consumes more than 62% of young leaves in its diet, higher than other *Presbytis* species (Ruhayat, 1983).

The absence of *Presbytis comata* in Sukasari can be explained by several ecological factors. First, the javan surili has more specific habitat preferences than *Trachypitecus mauritius*, particularly for old primary and secondary forests with dense canopy structures and the availability of specific food trees (Melisch & Dirgayusa, 1996; Supartono *et al.*, 2020). Research by Hermawan *et al.* (2021) shows that although the javan surili can be found in mixed gardens, its presence is highly dependent on the distance to natural forest and the abundance of specific food trees such as *Ficus* spp. and *Macaranga* spp.

Second, habitat fragmentation and population isolation can limit the dispersal of javan surili between regions. Supartono *et al.* (2020) found that the abundance of *Presbytis comata* in production forests in Kuningan Regency was significantly influenced by connectivity with natural forests and the level of anthropogenic disturbance. Differences in land use history between Mekarbuana and Sukasari are likely determining factors in the presence or absence of javan surili. The recorded group size (12 individuals) is within the normal range for *Presbytis comata*, which typically live in groups of 5–15 individuals with one dominant adult male (Ruhayat, 1983; Supartono *et al.*, 2016).

Hylobates moloch observed with low encounter rates at both locations (Mekarbuana: 0.98 ind/km; Sukasari: 0.23 ind/km) and low relative abundance (Mekarbuana: 9%; Sukasari: 6%). The

Javan gibbon is a Javanese endemic species categorized as Endangered by the IUCN Red List with an estimated population of fewer than 2,500 mature individuals in the wild (Andayani et al., 2020). The low population abundance reflects its critical conservation status due to habitat loss and forest fragmentation (Nijman, 2004).

The highest number of *Hylobates moloch* encounters in Mekarbuana (5 individuals) compared to Sukasari (1 individual) can be explained by differences in habitat size and connectivity. Javan gibbons have a large home range, ranging from 17 to 43.8 ha per family group (Nijman, 2004; Widyastuti et al., 2023), thus requiring a large enough forest area to support their needs. Kim et al. (2011) reported that Javan gibbons spend approximately 36% of their daily time feeding, with a primary diet consisting of fruits (52.3%) and young leaves (32.5%).

Javan gibbons live in monogamous systems with small family groups consisting of an adult pair and one to three offspring (Geissmann & Nijman, 2006). This social structure results in naturally lower population abundance compared to primates that live in large groups, such as *Trachypitecus mauritius*. Habitat fragmentation can hinder Javan gibbons' movement between groups and reduce opportunities for juvenile dispersal, which in turn can reduce genetic diversity and long-term population viability (Widyastuti et al., 2023). The Javan gibbon's distinctive vocalizations (duet calls) serve to defend territory and strengthen pair bonds, but can be disrupted by anthropogenic noise in areas with high human activity (Geissmann & Nijman, 2006).

Nycticebus javanicus recorded at both study sites with low relative abundance (Mekarbuana: 4%; Sukasari: 6%) and similar abundances of 0.39 ind/km in Mekarbuana and 0.23 ind/km in Sukasari. The Javan slow loris is a nocturnal primate endemic to Java that is categorized as Critically Endangered by the IUCN with an estimated population decline of more than 80% in the last three generations (Nekaris et al., 2020). The main threats come from illegal wildlife trade and habitat loss (Nekaris et al., 2008, 2013).

The low rate of Javan slow lorises encounters is consistent with research by Nekaris et al. (2014) who reported that although Javan slow lorises can be found in various habitat types including agroforestry and secondary forests, their population abundance remains low even in suitable habitats. In Mekarbuana, *Nycticebus javanicus* was found only in the nocturnal trails of Pandedomas and Cisea, while not observed in the Curug Cigentis, Jayanti, and Kejayaan trails. This limited distribution pattern reflects the specific habitat preference of Javan slow lorises for areas with the availability of bamboo trees for bedding and gum-producing trees for food (Cabana et al., 2017; Rode-Margono et al., 2015).

The Javan slow loris can coexist with humans in agroforestry landscapes as long as there is adequate canopy connectivity. This species relies heavily on tree sap as its primary energy source, particularly from the Fabaceae and Moraceae families, which it consumes year-round, even when fruit is available (Cabana et al., 2017). Detection of the Javan slow loris in nocturnal

surveys is strongly influenced by the observer's walking speed and the intensity of the lamplight. Nekarlis et al. (2014) recommend a survey speed of 200–400 m/h to maximize detection of the slow-moving Javan slow loris.

Relative abundance was slightly higher in Sukasari (6%) than in Mekarbuana (4%), although the lower abundance could be explained by the lower total number of primate individuals in Sukasari, resulting in a relatively larger proportion of Javan slow lorises. The threat of illegal trade in Javan slow lorises for the pet trade remains a serious concern, given the relative proximity of Mount Sanggabuana to human settlements (Nekarlis *et al.*, 2013).

Conservation Implications

Differences in primate species abundance and composition between Mekarbuana and Sukasari reflect habitat heterogeneity and differing disturbance histories at the two sites. The presence of *Presbytis comata* exclusively in Mekarbuana indicates that this site has better habitat quality for specialist folivorous species. Meanwhile, the higher dominance of *Trachypithecus mauritius* in Sukasari (89% vs. 67%) suggests that generalist species are better able to persist in habitats with lower primate species diversity.

Mount Sanggabuana, as a production forest area, requires a management strategy that integrates economic interests with biodiversity conservation. The presence of four protected primate species, including three endangered or critically endangered (*Presbytis comata*, *Hylobates moloch*, and *Nycticebus javanicus*), emphasizes the importance of this area as a critical habitat for Javan primates. Data on encounter rates and relative abundance from this study can serve as a baseline for long-term monitoring and evaluation of the effectiveness of conservation programs.

Priority conservation efforts that need to be undertaken include: (1) protection of habitat corridors to maintain connectivity between Mekarbuana and Sukasari, especially for *Hylobates moloch* which has a wide range; (2) intensive monitoring of illegal wildlife trade, especially for *Nycticebus javanicus* which is highly vulnerable to hunting; (3) habitat restoration by planting primate food trees, especially species from the Moraceae, Fabaceae, and Euphorbiaceae families; (4) development of conservation-based ecotourism with protocols that minimize disturbance to primate activities; and (5) education of local communities about the importance of primates as ecological agents in seed dispersion and forest regeneration.

CONCLUSION

This study identified four primate species in Mekarbuana (*Trachypithecus mauritius*, *Presbytis comata*, *Hylobates moloch*, and *Nycticebus javanicus*) and three species in Sukasari (*Trachypithecus mauritius*, *Hylobates moloch*, and *Nycticebus javanicus*). *Trachypithecus mauritius* was the dominant species in both locations with the highest abundance and the highest relative abundance. *Presbytis comata* was found only in Mekarbuana, indicating specific

habitat preferences. *Hylobates moloch* and *Nycticebus javanicus* had low abundances in both locations, reflecting their threatened conservation status.

Differences in primate abundance between Mekarbuana and Sukasari are influenced by food availability, vegetation structure, and habitat disturbance levels. The presence of *Presbytis comata* exclusively in Mekarbuana indicates that this location offers better habitat quality for specialist folivorous species. The results of this study provide important baseline data for primate conservation management on Mount Sanggabuana and emphasize the need for integrated habitat protection efforts with production forest management.

Further research is needed for: (1) long-term monitoring of primate populations with a focus on threatened species (*Presbytis comata*, *Hylobates moloch*, and *Nycticebus javanicus*); (2) more detailed feeding ecology studies to identify key food trees for each species; (3) population genetic analysis to understand population structure and levels of genetic diversity, particularly for the low-abundance of *Hylobates moloch*; (4) studies of the impacts of tourism and logging activities on primate behavior and distribution; and (5) mapping of habitat corridors connecting Mekarbuana and Sukasari to support primate dispersion and movement. Collaboration between area managers, local communities, and researchers is crucial to ensure the sustainability of primate populations on Mount Sanggabuana.

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