

INVENTORY OF WEST JAVA BLACK LANGUR [*Trachypithecus mauritius*] FEEDING PLANTS IN THE TAMAN SAFARI INDONESIA BOGOR FOREST AREA

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ABSTRACT

The West Java black langur is one of the endemic primates on the island of West Java. Currently, the conservation status of the West Java black langur (*Trachypithecus mauritius*) is categorized as Vulnerable status, registered in Appendix II. This research was carried out from January to March 2022. The purpose of the study was to determine the types of forage plants, and the parts eaten by the West Java black langur responsive found in the Taman Safari Indonesia (TSI) Bogor forest area. The research method used is the observation method through direct observation in the field. The results showed that there were 14 types of feed for the answering West Java black langur, divided into 12 families. The most dominant parts of the plant eaten by responsive West Java black langurs are young leaves 42%, shoots 30%, and others 28%.

Keywords: Black Langur, Feeding Plants, Inventory, Taman Safari Indonesia Bogor, West Java

INTRODUCTION

The Taman Safari Indonesian (TSI) Bogor forest area is a buffer zone from the Taman Nasional Gunung Gede Pangrango (TNGGP) forest area which has been designated as a Conservation Institution (CI). The TSI Bogor area which has an area of 2.650.000 m² (265 ha) is a former tea plantation and mixed garden owned by the Cisarua South tea plantation company which is no longer productive, which is directly adjacent to the TNGGP forest area. In the General Spatial Plan (RUTR) for the Puncak Area (Keppres 79/85), the TSI Bogor area is included in the Non-Agricultural Cultivation Area which is designated as a Tourism Area, namely the Puncak Indah Tourism Area (covering 3 sub-districts namely Ciawi, Megamendung and Cisarua). At the time of its construction, TSI Bogor had planted more than 600 thousand trees for reforestation so as not to eliminate the area's important function as a water catchment area.

Indonesia is one of three countries, with the richest variety of primate species in the world. Around 550 species of primates exist in the world (IUCN, 2022), 64 species of primates are found in Indonesia and some of them are endemic primates. The West Java black langur in charge (*Trachypithecus mauritius*) is a primate species endemic to Indonesia on West Java Island, included in the vulnerable category based on the International Union for Conservation of Nature (IUCN) Red List Data 2022. In the Decree of the Minister of Environment and Forestry of the Republic Indonesia No.P.106/MENLHK/SETJEN/KUM.1/12/2018, the Cercopithecidae family has also been protected. In the list of the Convention on International Trade in Endangered

Species of Wild Fauna and Flora (CITES, 2016). The West Java black langur is included in Appendix II. This black langur is spread in the forests of West Java Province, Banten Province, and DKI Jakarta Province. So far it has been recognized that there are two subspecies of the black langur, which are distinguished by their distribution area: the eastern black langur (*Trachypithecus auratus auratus*), whose distribution covers the eastern part of West Java Province, to East Java Province, Sempu, and Nusa Barung Islands, Bali Province, as well as Lombok. Western black langur (*Trachypithecus auratus mauritius*). Its distribution covers the province of Banten and half of the western part of West Java Province, including Ujung Kulon, Jasinga, Bogor, Cisalak, Jakarta, Palabuhanratu, to the east on the south coast to Cikaso, or Ciwangi in the interior (Brandon-Jones, 1995). According to research by Roos et al. (2008, 2014), the western black langur race is considered a separate species (*Trachypithecus mauritius*).

Forage plants are one of the most important determinants of the life of the West Java black langur. The feed available is quite good and of good quality, very supportive for life, as well as the reproductive process of the West Java black langur. According to Giovana (2015), the results of research by several researchers' state that the types of vegetation that are often eaten by the Javan langurs include Tappen (*Mallotus floribundus*), Saninten (*Castanopsis javanicus*), Sea ketapang (*Homalanthus populneus*), Ganitri (*Elaeocarpus spaericus*), and Tides (*Quercus sundaicus*). Meanwhile, according to Utami (2010), the types of trees that feed the Javan langur include Sengon tekik (*Albizia* sp.), Ipik (*Ficus superba*), Cap (*Mallotus floribundus*), Tide (*Quercus sundaica*), and Guava (*Syzygium* sp.). According to Leksono (2014), the types of feed for the Javan langur include Guava (*Syzygium* sp.), forest mangosteen (*Garcinia laterifolia*), Putat (*Barringtonia racemosa*), and Salam (*Syzygium polyanthum*). Furthermore, according to Ihsanu et al. (2014), the types of feed for Javan langurs include Kiara (*Ficus annulata*), Tissue (*Hibiscus macrophyllus*), and Mahogany (*Swietenia mahagoni*). Not all types of plants can be used as a source of feed and only certain types of forage plants are selected and can be consumed by the black langur in answer. The purpose of this study was to obtain data on the types of feed plants for the black langur in the TSI Bogor forest area, as well as to find out which parts of the plant the black langur (*Trachypithecus mauritius*) prefers. The benefits results of this study can provide information about the type of feed, and the parts eaten by West Java the black langur in the Bogor, TSI forest area, and can be used as a basis for management. Especially for the answerable West Java black langur species in the Conservation Institution (CI) TSI forest area in general.

METHOD

This research was carried out from January to March 2022, this research was carried out from January to March 2022. Data collection was carried out every day (Monday-Saturday) from 06.00-17.00 pm. Which is located in the Bogor, TSI forest area. West Java. Administratively, it is located in Cibeureum Village, Cisarua District. Bogor Regency. West Java Province. Geographically, TSI Bogor is located at 06°42'10"-06°43'25"- South Latitude (SL) and 106°56'40"-106°57'40"- East Longitude (EL), at an altitude of 1076-1416 meters above sea level (asl). The northern (downstream) boundary is a settlement and mixed orchard, while the southern boundary is the TNGGP area, so the TSI Bogor forest area is a buffer zone for the TNGGP area. The reason for this research is that there has been no research on West Java black langurs in ex-situ areas, especially the TSI Bogor forest area. The TSI

Bogor area has an area of 2.650.000 m² (265 ha), with land cover in the form of forest and greening areas covering an area of 2.495.737.33 m². In this research, activity was carried out in forest and reforestation areas with an area of 249 ha (Figure 1).

The equipment used in this study included stationery, binoculars, a Global Positioning System, clocks, Nikon P1000 digital cameras, tally sheets (calculation sheets), Asus computers, and maps of the TSI Bogor area. The object observed in this study was the West Java black langur (*Trachypithecus mauritius*) in the Bogor, TSI forest area. Consists of fifteen individuals in one group.

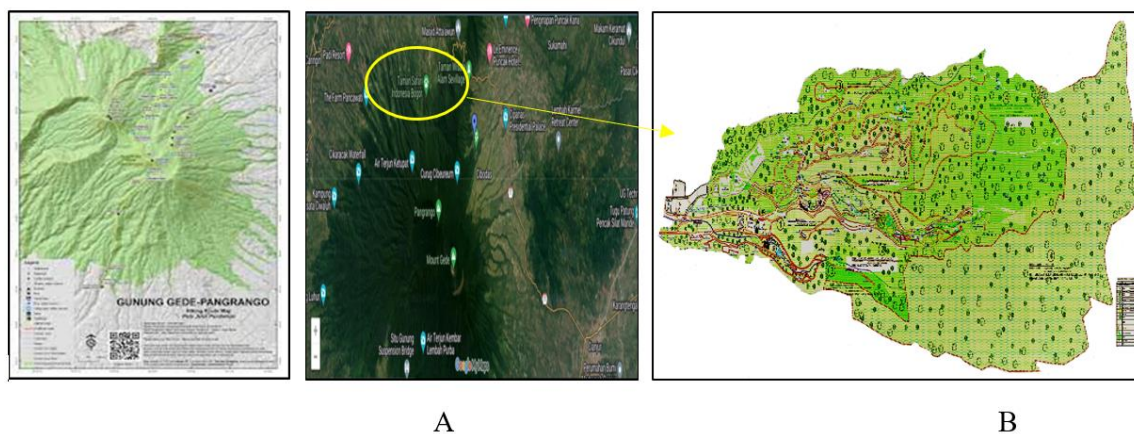


Figure 1. A. TNGGP area map and B. Map of the TSI Bogor forest area, West Java black langur observation area which is green in color.

Feed Type

Data collection on the types of feed plants consumed by the West Java black langur is recorded. The data on the types of forage plants for the West Java black langur of the TSI Bogor forest area consists of two parameters, namely the types of forage plants and the parts of the plants eaten. Data was collected using a survey method through direct observation in the field (Sugiyono, 2014). The data collected in this study includes primary data and secondary data. Preliminary data observations in the field need to be carried out to find out and identify places where West Javan black langurs usually congregate, for feeding, and other activities. Primary data is data obtained through direct observation in the field, including a selection of types of feed, and that part eaten by the West Javan black langur. The data collection technique was carried out by following groups of West Javan black langurs in their habitat directly, from morning 06.00 to evening 17.00 pm, and recording all types of feed eaten. Secondary data was obtained through literature studies from research and previously existing ones.

Data Analysis

The types of plants the West Javan black langur feeds on are recorded directly and documented. Direct observation by noting the types of plants eaten by the West Javan black langur in the meeting, and noting the parts of the plants eaten such as leaves, shoots, fruit, flowers, twigs, skin, and others. Data obtained for determining the type of feed eaten can be calculated using a formula from Fachrul (2008) as follows:

$$No = \frac{Ni}{N} \times 100\%$$

Information:

No: Relative frequency of types of feeding. Ni: frequency of each type of feed. N: the total frequency of all types of feed.

The results of observing the type of feed and the parts eaten by the West Javan black langur are presented in tabular form and then analyzed qualitatively descriptively.

RESULTS AND DISCUSSION

Feed type

The existence of forage plants is very important for the sustainability of the West Java black langur. The results of the study obtained 14 plant species that were feed sources for the West Java black langur in the TSI Bogor forest area. These fourteen species are divided into 12 families in (Table 1). The favorite feed trees for the West Java black langurs in the TSI Bogor forest area are Sengon trees (*Albizia chinensis*), Rasamala (*Altingia excelsa*), Cinnamon (*Cinnamomum verum*), Puspa (*Schima wallichii*), and African tree (*Maesopsis eminii*). The type of feed and the level of preference can be determined by calculating the amount of feed consumed every day from 07.00 to 17.00 WIB. According to Wardhana et al. (2022) research results, 45 plant species were obtained from the pole level and trees. Some of the dominant species are *Homalanthus giganteus*, *Quercus sondaicus*, *Engelhardia spicata*, and *Trema orientalis*.

According to Mustari et al. (2019), the parts of the plant that the West Java black langur prefers are the parts of the plant which include leaves, shoots, fruit, and flowers. The same thing was also conveyed by Partasasmita et al. (2016). Langurs consume several parts of plants, including leaves, flowers, fruit, shoots, and twigs. In addition, there are several types of fruit-producing plants that feed for black langurs and for other primate species such as Javan surili (*Presbytis comata*), Javan gibbon (*Hylobates moloch*), and long-tailed monkey (*Macaca fascicularis*). The types of plants consumed include Kondang (*Ficus variegata*), Kiara (*F. altissima*), Ketapang (*Terminalia catappa*), Dahu (*Dracontomelon dao*), and Belimbing wuluh (*Averhoa bilimbi*) (Mustari et al. 2019). According to Supriatna and Wahyono (2000) generally black langurs (*Trachypithecus auratus*) eat approximately 80% of leaves, 10% of shoots or shoots, and 10% of the fruit. Eliana et al. (2017), stated that langurs are primates that are folivorous (leaf eaters), therefore the Javan langur (*Trachypithecus auratus*) in this study ate more leaves than fruit. The preference level of West Java black langur (*Trachypithecus mauritius*) on leaves is more than on fruit.

For this reason, the feed sources in the TSI Bogor forest area are still quite good, this can be seen from the availability of plants which are a source of feed for the West Java black langur and types of fruit throughout the year. Ensuring the availability of feed for the answerable West Java black langur and other primates in the TSI Bogor forest area.

Table 1, shows that there are more West Java black langurs that consume young leaves and shoots compared to other parts of the tree. The Statement is confirmed by Supriatna and Wahyono (2000). According to Ayunin et al. (2016),

among the factors that can influence the presence of langur, namely the presence of feed sources, tree physical characteristics, habitat characteristics, topography diversity of vegetation, tree density forage, high vegetation density, and tree size. That langur is more consumes a lot of leaves compared to other plant parts. From the results of research on the types of West Java black langur feed obtained at this research location, there are also several types obtained by research elsewhere According to research by Riyadi (2010) in the Talaga Warna Nature Reserve Bogor Regency, mentions that there are 36 types of Javan langur feed, the data was obtained based on data from the West Java BKSDA and results in direct observation in the field. The same type of vegetation is consumed by the famous Javan langurs (*Ficus variegata*), Kiara (*Ficus altissima*), Huru (*Machilus rimota*), and Putat (*Barringtonia acutangular*). Besides that, there is also the same vegetation but not in the Cilame and Cimeudeum Blocks the discovery of Javan langurs consuming this type of vegetation, including Pisitan monkey (*Glianthus populacus*), Kilalayu (*Lepisanthes tetraphylla*), Kihuni (*Antidesma bunius*), Hantap (*Sterculia coccinea*), and Saninten (*Castanopsis argentea*). So that the type of Javan langur feed that is in TWA there are 18 species of Mountain Tampomas.

Table 1. Types of feed plants for West Java black langurs in the TSI Bogor forest area

Natural feed (local name)	Latin Name	Family	Information (eaten part)
Kayumanis	<i>Cinnamomum verum</i>	Lauraceae	Young leaves
Jing-jing/Sengon/ Albazia	<i>Albizia chinensis</i>	Fabaceae	Young leaves
Pasang	<i>Quercus glauca</i>	Fagaceae	Young leaves
Rasamala	<i>Altingia excels</i>	Hamamelidaceae	Young leaves
Kihujan	<i>Engelhardia spicata</i>	Juglandaceae	Young leaves
Kuray	<i>Trema orientates</i>	Cannabaceae	Young leaves
Beunying	<i>Ficus fistula/osa</i>	Moraceae	Young leaves and fruit
Pinus	<i>Pinus mercurii</i>	Pinaceaedengan	Young fruit
Puspa	<i>Schima wallichii</i>	Theaceae	Young leaves
Kisireum	<i>Syzygium polyanthum</i>	Myrtaceae	Young leaves
Nangka	<i>Artocarpus heterophyllus</i>	Moraceae	Shoots and fruit
Kaliandra	<i>Calliandra callothyrsus</i>	Fabaceae	Shoots and flowers
Ketapang	<i>Terminalia catappa</i>	Combretaceae	Young leaves
African tree	<i>Meisopsis eminii</i>	Rhamnaceae	Unripe and ripe fruit

The part of the plant that is consumed

Based on observations, plant parts that are eaten by the West Java black langur observations are generally made of young leaves and shoots. These types of forage plants are mostly consumed on the leaves, which contain high protein to meet the needs of life Li et al. (2020). According to Zakki et al. (2017), the composition of the Javan langur diet includes 50% leaves, 32% fruit, and 13% flowers and the rest is from plants and insects. Eliana et al. (2017) explained that Javan langur is a primate that is folivorous (leaf eaters) with more leaves than fruit because it is supported by the digestive system very long.

The most dominant parts of the plant eaten by responsive West Java black langurs are young leaves 42%, shoots 30%, and others 28%. According to Prayogo (2006), langurs prefer young leaves to old leaves because of their soft structure and bright color as well as based on the content of young leaves containing nutrients compared to old leaves. Leaf shoots are the favorite feed of the West Java black langur. When the

West Java black langur group is on the feed tree, the West Java black langur group immediately eats young leaves or shoots in a Not-too long time. It is very complex and has many factors, namely the amount of energy needed in moving mode (walking, running, jumping, flying), environmental conditions, seasons, distribution of feed sources, presence of predators, and competitiveness Dutta (2019). The West Java black langur in answer immediately moves to other plant species to carry out feeding activities (Figure 2).

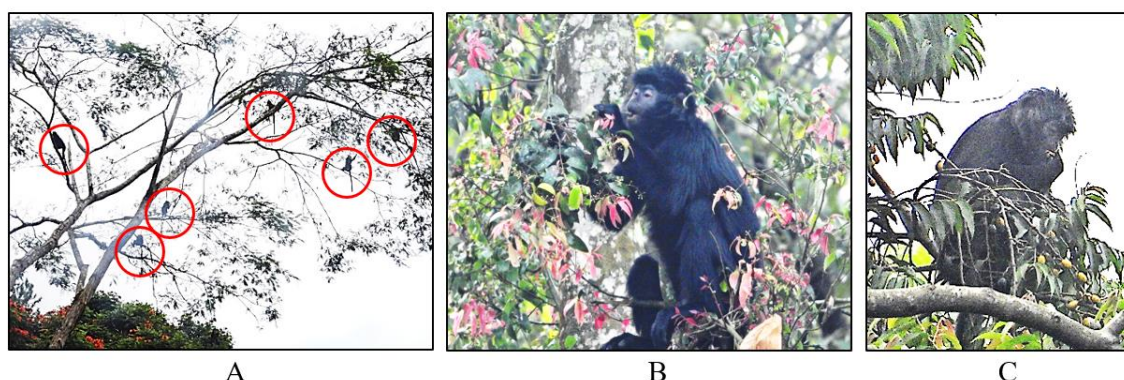


Figure 2. A. Group of West Java black langurs eating *Albasia/jing-jing/Sengon* (*Albizia chinensis*) leaves; B. Eating cinnamon leaves (*Cinnamomum verum*); C. Eats the fruit of the African tree (*Maesopsis eminii*) found in the field. Photo source: Walberto Sinaga.

According to several other researchers, primates including the Javan langur are "happy" to change their feed choices. This is due to three factors, including the nutritional content, needs, and abilities of each species which are different (Richards and Coley, 2007). In addition, high species diversity is positively correlated with increased stability within an ecosystem (Lucini et al. 2020). As for how the black langur in answer to feeding is generally not much different from other primates, the technique is to take or pull the part that you want to eat, smell it (scent), put it in your mouth, and then chew it. The Javan langur (*Trachypithecus auratus*) has natural feeds such as leaves and forest fruits which are ideal feed for animals that live in the forest. Javan langur (*Trachypithecus auratus*) has a complex stomach and contains bacteria to decompose leaves and is able to neutralize poisons (Vermeulen et al. 2001). The black langur has a special digestive system, including its stomach which can expand.

To survive, the monkeys have to eat a large number of leaves. Thus after eating, the amount of feed stored in the stomach is more, up to a quarter of the total body weight and even more (Rowe, 1996). According to some researchers, Javan langurs are folivorous animals or leaf eaters (both young and old leaves). This species also feeds on flowers, flower buds, seeds, fruit (ripe and immature), and insect larvae (Kool, 1993; Nijman, 2000). Feed for *Trachypithecus auratus* consists of leaves that are rich in protein and have low fiber (Kool, 1992). Javan langurs are folivorous primates (leaf eaters) therefore the langurs in research eat more leaves than eat fruit. Javan langurs as a rich leaf eaters of fiber still allow eating fruit because supported by a very digestive system long. The young leaves of the teak tree (*Tectona grandis*) are an important feed source when the main feed is scarce (Kool, 1993). Not only that, the dense canopy has an important role in the movement of foraging. Potential plants with high density can be ideal conditions for Javan langurs because tree crowns can overlap, which is helpful for moving from one tree to another (Sari et al. 2020). Each

individual continues to eat while moving or resting (Kool, 1993). Adult males eat less frequently than other groups of adults and juveniles (Brotoisworo and Dirgayusa, 1991).

CONCLUSIONS

The results showed that there were 14 types of feed plants for the black langur in the TSI Bogor forest area, divided into 12 families. The most preferred types of forage plants in the TSI forest are Sengon leaves (*Albizia chinensis*), Rasamala leaves (*Altingia excelsa*), Cinnamon leaves (*Cinnamomum verum*), Puspa leaves (*Schima wallichii*), and African tree fruit (*Maesopsis eminii*). The most dominant parts eaten by the West Java black langur in the TSI Bogor Bogor forest are the young leaves and shoots. The most dominant parts of the plant eaten by responsive West Java black langurs are young leaves 42%, shoots 30%, and others 28%. TSI Bogor is a conservation organization that has an important role in preserving the West Java black langur. For this reason, TSI Bogor continues to preserve and protect the habitat of the West Java black langur which is responsible for the TSI Bogor forest area.

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