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## **The Activity of Long-tailed Macaque (*Macaca fascicularis*) at Plantation Forest in Ogan Komering Ilir Regency, South Sumatera**

*Aktivitas Monyet Ekor Panjang (*Macaca fascicularis*) di Hutan Tanaman Industri Kabupaten Ogan Komering Ilir, Sumatera Selatan*

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### **ABSTRAK**

Monyet ekor panjang (*Macaca fascicularis*) termasuk hewan yang adaptif sehingga dapat dijumpai di berbagai tipe habitat, salah satunya di kawasan Hutan Tanaman Industri. Kegiatan operasional yang berjalan di dalam kawasan Hutan Tanaman Industri dapat memicu perubahan perilaku monyet ekor panjang, perubahan jenis makanan, serta berpotensi mengekspansi ke areal tanaman pokok akasia, sehingga perlu dilakukan penelitian guna mempelajari aktivitas monyet ekor panjang dalam memanfaatkan habitat di kawasan Hutan Tanaman Industri, serta mengetahui jenis-jenis tumbuhan yang dimanfaatkan oleh monyet ekor panjang baik sebagai pakan maupun sebagai tempat beristirahat. Penelitian dilakukan di Hutan Tanaman Industri di Distrik Sungai Penyabungan Kabupaten Ogan Komering Ilir. Aktivitas dan penentuan jenis tumbuhan yang dimanfaatkan oleh monyet ekor panjang diamati menggunakan metode focal animal sampling dengan interval waktu 10 menit dari pukul 07.00–17.00 WIB yang dilakukan pada bulan April dan Mei 2019. Oleh karena itu penelitian ini bertujuan untuk memperoleh informasi tentang aktivitas kera ekor panjang terkait pemanfaatan habitat di Hutan Tanaman dan untuk mengetahui jenis tumbuhan yang dimanfaatkan kera ekor panjang untuk makanan dan tempat berteduh. Hasil penelitian meliputi persentase total aktivitas yang dilakukan monyet ekor panjang yakni makan sebesar 24,60%, istirahat sebesar 25,58%, berpindah sebesar 27,92%, dan aktivitas sosial (bersuara, agonistik, dan menelisis) sebesar 21,89%. Bagian tumbuhan yang dikonsumsi oleh monyet ekor panjang yakni bagian daun (42,30%), bagian buah (34,62%) dan bunga (23,08%). Jenis tumbuhan yang dimanfaatkan sebagai pakan sebanyak tiga jenis yakni akasia (*Acacia crassicarpa*), gelam (*Melaleuca cajuputi*), dan senduduk (*Melastoma malabathricum*). Tumbuhan yang digunakan sebagai tempat berlindung dan beristirahat berasosiasi dengan tumbuhan pakan yaitu pohon *Acacia crassicarpa*.

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Kata kunci: akasia, aktivitas, monyet ekor panjang

## ABSTRACT

Long-tailed macaque (*Macaca fascicularis*) is a quite adaptive animal so it could be found in a diverse range of habitat types, one of the habitats is Plantation Forest on peatlands. The operational activities in the Plantation Forest can affect the activities of long-tailed macaque, changing of food sources, and they have a potential to attack the Acacia plants, so it's necessary to do research about the activity of long-tailed macaque related to the habitat utilization at Plantation Forest and to acknowledge the types of plants used by long-tailed macaque for food and shelter. This research is a descriptive study and the data are obtained through a focal animal sampling method in April and May 2019 at the Plantation Forest in Sungai Penyabungan District, Ogan Komering Ilir Regency. Therefore this study aimed to obtain the information about the activity of long-tailed macaque related to habitat utilization at Plantation Forest and to cknowledge the types of plants used by long-tailed macaque for foods and shelter. The focal animal sampling method used at 07.00–17.00 WIB with using interval of 10 minutes. Based on the study, the long-tailed macaque used the active time to feed (24.60%), rest (25.58%), move (27.92%), and social activities (21.89%) included vocalization, agonistic, and grooming. The vegetation parts consumed by the long-tailed macaque are leaves (42.30%), fruits (34.62%), and flowers (23.08%). The vegetation used as food is *Acacia crasscarpa*, *Melaleuca cajuputi*, and *Melastoma malabathricum*. The plant that's most often used as food and shelter is *Acacia crasscarpa*.

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Keywords: acacia, activities, long-tailed macaque

## INTRODUCTION

A country that wants the conservation of natural resources must able to implement environmentally sound development, therefore it's needed the effort of maintaining and sustaining the natural resources because in the first place an ecosystem cannot stand alone (Juniah, 2017). The area of land resources is very limited and could not be renewed, on the other hand, land needs continue to grow in line with population growth (Chuzaimah et al., 2019). Whereas in Indonesia peatlands are the most widely owned land among other tropical countries with a total area in Indonesia estimated at around 14.93 million acres and the largest peat swamp areas in Indonesia reaching 35% are in Sumatra (Ratmini, 2012). Of the total land area, only 5.6 million acres have potential uses (Subatra, 2013). Peatlands are classified as marginal and fragile land with usually low productivity and are very easily damaged, so conservation and optimization of peat swampland utilization must be done according to its characteristics where it requires data on types, characteristics, and

distribution (Ratmini, 2012). In general, peat is marginal and fragile land because it is naturally unable to sustain optimal plant growth and is prone to degradation when reclaimed (Subiksa, 2018). One of the uses of peatlands is land for plantations forest. One of the plants used in plantation forest is *Acacia crasscarpa*, which is a good species to be developed in swamp and peat areas because it is fast-growing (Martinus, 2017). One of the animals that form part of the formation of a forest ecosystem is a long-tailed macaque. One of the long-tailed macaque habitats that are inhabited is in the industrial plantation forest area in the Sungai Penyabungan District, Ogan Komering Ilir Regency, South Sumatra.

Long-tailed macaque (*Macaca fascicularis*) is one of Primates Order, Sub Order Haplorrhini, Family Cercopithecidae, Sub Family Cercopithecinae, and Genus *Macaca* (Hassel-Finnegan et al., 2013). Long-tailed macaques live in a group in multi-male nor multi-female and they have a social hierarchy structure, led by the dominant male or alpha male (Hambali et al., 2012). Long-tailed macaque's activities are categorized into social affiliation, social

agonism, and nonsocial activities (Lee et al., 2012). Nonsocial activities carried out by long-tailed macaque are feeding, moving, and inactive. In feeding behavior, the fruit of the plants is the most part that long-tailed macaque prefer to eat (Mollet, 2013).

Long-tailed macaque could be found in various types of habitat because this species is extremely adaptable to its environment (Ruppert et al., 2018). Long-tailed macaque's varied habitat could form the behavior change and the long-tailed macaque tends to be more aggressive

The emergence of long-tailed macaque's activity such as invading out from the natural habitat and resulting in damage to agricultural fields, settlements, and plantations could be triggered from disruptions of their natural habitat nor their population density that exceed the habitat capacity (Kusumadewi et al., 2014). Changes in the behavior of long-tailed macaque in negative impact could be caused by human factors that they usually enter the long-tailed macaque's territory area (Hernawati et al., 2016). Therefore this study aimed to obtain the information about the activity of long-tailed macaque related to habitat utilization at Plantation Forest and to cknowledge the types of plants used by long-tailed macaque for foods and shelter.

## MATERIALS AND METHODS

This research was conducted in April and May 2019 for 7 days. The research location was in the Plantation Forest in Sungai Penyabungan District, Tulung Selapan, Ogan Komering Ilir Regency, South Sumatra. The tools used in this study were stationery, GPS (Global Positioning System), cameras, environmental kits, binoculars, and tally sheets. The encounter with the long-tailed macaque was done through exploration in the study area. Every point of encounter with a long-tailed macaque was recorded by GPS. Observation of long-tailed macaque's

activities and determining the feed types was carried out with focal animal sampling methods (Taherdoost, 2016). Long-tailed macaque was observed directly with binoculars and the distance of observation about 25–50 meters. At the observation area, the amount of long-tailed macaque that found was counted and each meeting point recorded with GPS. Supporting plant species can be divided into two types, namely plants used as food and plants used as a place to rest or play and do other activities.

The focal animal sampling method was used when the long-tailed macaque was eating, then the plants that were eaten and the trees that were often climbed were observed and identified directly in the field (Zairina et al., 2015). The focal animal sampling method was done by focusing the observations on one individual and was considered representative to conclude the group's activities namely mature male individuals or the alpha male. Observation activities were classified into the morning observation period (07.00–10.00 am), the midday observation period (10.00 am–2.00 pm), and the evening observation period (02.00–05.00 pm).

The observed patterns of activity included resting (sitting, lying, closing my eyes), moving (walking, jumping, climbing), eating (holding, picking, putting in the mouth), and social activities (mating, grooming, vocalization, and agonistic/fight). The time interval carried out in observations was 10 minutes (Moua et al., 2020). Data analysis was performed descriptively and presented in graphical form. The calculation of the percentage of daily activities according to (Bateson & Martin, 2021) was calculated using the following formula:

Percentage of activity

$$= \frac{\text{frequency of an activity occurrence}}{\text{total frequency of all activities}} \times 100\%$$

While the use of vegetation as a source of long-tailed macaque feed was calculated

based on the amount and frequency of feed consumed, then formulated as follows:  
Percentage of food resources=

$$\frac{\text{frequency of one type of food eaten}}{\text{total frequency of food eaten}} \times 100\%$$

## RESULTS

### The activity of Long-tailed Macaque

The activities observed included feeding (24.60%), resting (25.58%), moving (27.92%). While social activities showed a percentage of 21.89% including vocalization (7.26%), agonistic (1.35%), and grooming (13.28%). The total percentage of long-tailed macaque's activity in the Plantation Forest area in

Ogan Komering Ilir, South Sumatra from 07.00 am-5.00 pm was presented in Figure 1.

### Plants that were Used by the Long-Tailed Macaque

Observation results showed that long-tailed macaques make use of vegetation in the "Petak Tanaman Kehidupan" in industrial forest plantations which were overgrown with wild acacia, shrubs, gelam, and bushes. The plant parts used as feed by long-tailed macaques were shown in Table 1 and data on plant species consumed by long-tailed macaques in industrial forest plantations were presented in Table 2.

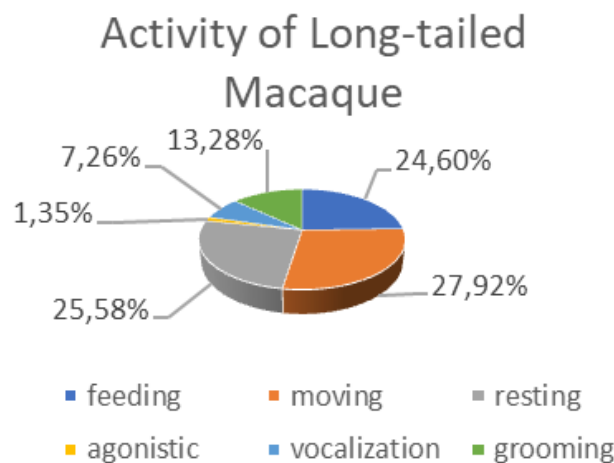


Figure 1. Total percentage of long-tailed macaque's activity at plantation forest

Table 1. Parts of plants used as feed by a long-tailed macaque in plantation forest

Species of Plants	Parts of Plant		
	Leaves	Flower	Fruit
<i>Acacia crasscarpa</i>	6		7
<i>Melaleuca cajuputi</i>	5	4	2
<i>Melastoma malabathricum</i>		2	9
Percentage of the Utilization of Plant Parts	42.30%	23.08%	34.62%

Table 2. Percentage of plant species used as feed by a long-tailed macaque in industrial plantations

Species of Plants	<i>Acacia Crasscarpa</i>	<i>Melaleuca Cajuputi</i>	<i>Melastoma Malabathricum</i>
Percentage	50%	42.30%	7.70%

## DISCUSSION

### The Activity of Long-Tailed Macaque

Moving activities carried out by long-tailed macaque shows the highest percentage reached 27.92%. This includes moving to other branches, climbing, walking on tree branches, and moving to other trees. The move is a long-tailed macaque's attempt to find a food source, approach other individuals in the group, find shelter, and stay away from observers. According to Purbatrapsila et al. (2012), moving is the activity most often performed by a long-tailed macaque in the Tinjil Island Natural Spring Captive and the peak of this activity occurs at 10.05-11.00 am due to the instinct to search for food. The movement of individual males in groups is an effort to guard and supervise territory (Octavia et al., 2017). Male individuals are in charge of leading the group so that many do aggressive movements and behaviors to protect the group (Mondoringin et al., 2016).

The second activity which is mostly done is resting with a percentage of 25.58%. Observed, long-tailed macaque took a rest a lot on the trees. This activity includes sitting still on a tree branch and occasionally observed this long-tailed macaque trying to close his eyes but still in a state of alert. Long-tailed macaques do a lot of rest compared to eating and moving in the afternoon period. Research by Purbatrapsila et al. (2012) reported that resting activity decreased from the initial observation in the morning until noon, and the percentage increased to peak at 03.05–4.00 pm. The group of long-tailed macaque in the study tended to reduce the frequency of their resting activities when eating and moving.

Feeding activity includes picking plant parts, putting it in your mouth, chewing and swallowing. The percentage of this activity reaches 24.60% and is the third most done by long-tailed macaques. Judging from the level of percentage, this shows the difference from the research of Jelantik et

al. (2017) and Purbatrapsila et al. (2012) which states that eating activity is the second activity that has the highest proportion after switching activity. According to Karyawati (2012), food availability is one of the factors that influence Macaca's eating behavior.

The next recorded activity is a social activity that involved other individuals in the group, including grooming (13.28%), vocalization (7.26%), and agonistic (1.35%). The percentage of total social activity of 21.89% indicates that social activity is less frequent than non-social activity. Grooming behavior that includes social activities carried out by long-tailed macaques in the plantation forest area is related to resting activity. According to Jelantik et al. (2017), grooming behavior is related to resting behavior which is observed when alpha male at rest tends to obtain grooming services from female macaques.

During the observation, is observed vocalization behavior carried out by the long-tailed macaque as a form of interaction among group members. In this case, including making a sound when aware of the observer's presence and when doing agonistic activities. vocalization activity when realizing human presence is a reaction of vigilance that becomes the nature of animals. According to Hidayat (2016), the level of vigilance of long-tailed macaques towards human presence is higher in undisturbed habitats where they are far from settlements than in disturbed habitats. The percentage of agonistic activity is the lowest (1.35%). Long-tailed macaques are rarely seen fighting on trees and it is suspected that the individual fighting positions are on the forest floor. According to Jelantik et al. (2017), this agonistic behavior is often carried out by dominant male macaques to fight over food in the morning where these dominant male individuals intimidate other macaques that have a low rank in their groups. This activity shows the lowest percentage because this activity is generally avoided.

After all, it causes energy to be quickly drained and cause injury and physical disability.

### **Plants that are Used By the Long-Tailed Macaque**

The part of vegetation that is most consumed by long-tailed macaque is the leaf (42.30%). In addition to utilizing the leaves, macaques also consume parts of fruit (34.62%) and flowers (23.08%). This is different from Anggraeni (2013) study which states that the part of plants that are most used by long-tailed macaque as food is the fruit. This difference in food preferences can be triggered by seasonal changes when the fruit season is not in season, primates will utilize other plant parts such as young leaves, flowers, and seeds to meet their food needs.

Three types of vegetations are used as food, namely acacia (*Acacia crassicarpa*), paperbark tree (*Melaleuca cajuputi*), and senduduk (*Melastoma malabathricum*). This shows that the number of plant species consumed by a long-tailed macaque in the "Petak Tanaman Kehidupan" is less than in some previous studies in other habitats. Research by Kamilah et al. (2013) found 15 species of plants that are used by long-tailed macaque as food in the Rajolelo Forest Park in Bengkulu. The utilization of acacia plants occupies the highest percentage of 50%. The part of acacia used by long-tailed macaque is the leaves and fruit. The utilization of gelam plants by macaque is 42.30% where the plant parts consumed are in the form of leaves, flowers, and fruit. The vegetation is consumed as much as 7.70% by utilizing part of the flower. In the research of Hafsari et al. (2014) recorded that the long-tailed macaque in Taman Wisata Alam Punti Kayu Palembang consumed the flowers and young leaves of *Acacia crassicarpa* (10.40%). This shows that the long-tailed macaque in the "Petak Tanaman Kehidupan" prefers acacia as its food.

During the observations made, the resting activity of long-tailed macaque is

observed to be mostly done above the trees. The tree used as a shelter and the rest is acacia (*Acacia crassicarpa*). This is because, in these areas, the vegetations that have wide canopies and large branches are only acacia plants so that these plants can provide shade. The use of vegetation as a place for shelter is most often used in acacia plants with variations in height of 5 to 7 meters. In the long-tailed macaque habitat found, acacia trees are the most likely plants to protect long-tailed macaques. The canopy of trees used as shelter is quite wide, according to Purbatrapsila et al. (2012) tight tree canopy cover chosen by long-tailed macaque because it can minimize the energy loss factor so that long-tailed macaque can rest in a comfortable place and can protect their bodies from hot and cold temperatures. Arboreal fauna requires a high tree density to protect its population (Bismark, 2012).

The position of the long-tailed macaque when resting is in a tree branch with a height of 3-5 meters. Based on the entire pattern of long-tailed macaque activity observed with habitat use in the plantation forest area, it can be said that disturbance around the long-tailed macaque habitat does not result in changes in the natural behavior of the long-tailed macaque. This can be seen from the response made when meeting humans, long-tailed macaques tend to avoid.

Long-tailed macaque habitat in Kuala Selangor Nature Park that has been disturbed causing conflicts between macaques and humans, causing intensive contact with humans so that the behavior of macaque changes and tends to exploit the surrounding food resources (Hambali et al., 2012). The conflict between humans and long-tailed macaques related to changes in forest function and the decline in habitat quality becomes an environmental challenge in forest and wildlife management. Thus, special monitoring of long-tailed macaque populations and protection of their habitat is needed to prevent this conflict (Figure 2).





(a)



(b)

Figure 2. (a) Long-tailed macaque is taking a rest on *Acacia crassicaarpa*; (b) Long-tailed macaque is using *Melaleuca cajuputi* as food (Source: Personal Doc, 2019)

## CONCLUSION

The result of this study of long-tailed macaque's activity at plantation forest shown by the total percentage of the activity in their active time and the most activity done by the long-tailed macaque is moving (27.92%). Related to the habitat usage, long-tailed macaque preferred to use *Acacia crassicaarpa*, *Melaleuca cajuputi*, and *Melastoma malabathricum* as food resources. The parts of the plant consumed by the long-tailed macaque leaves (42.30%), fruits (34.62%), and flowers (23.08%). While *Acacia crassicaarpa* is the most plant used as a food resource and a shelter by long-tailed macaque.

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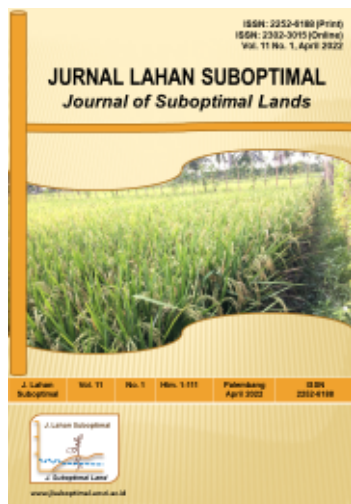
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