



## Home Range Estimation and Food Plants Preference of *Presbytis comata* at Situ Patengan Nature Reserve

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Home range; Food preference; *P. comata*

### Abstract

Surili (*Presbytis comata*) is one of endemic primates of West Java whose existence is protected. The purpose of the research was to determine the estimated home range and the preferences of food plant of *P. comata* at Situ Patengan Nature Reserve, West Java. The home range was determined by the *minimum convex polygon* method by connecting the coordinates of the outermost entire outer area groups. *Focal animal sampling* and *Ad-libitum* methods were applied to obtain data of food preferences in details. The result showed that home range of several *P. comata* groups at Situ Patengan Nature Reserve were varied. The home range of group A, B, C, and D were covering 3.52 Ha, 4.43 Ha, 3.76 Ha, and 3.14 Ha respectively, while the solitary individual has a home range covering 2.64 Ha. There were 27 species from 16 families of plants that was directly consumed by *P. comata*. *P. comata* more often consumed *Castanopsis javanica* (10.07%), *C. argentea* (9.35%), *C. tungurut* (7.91%), *Sloaneasigun* (7.91%), and *Quercus* sp (7.19%). This data can be useful as a reference in *P. Comata* population and habitat management especially in the area of Situ Patengan.

### How to Cite

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## INTRODUCTION

Indonesia is a country that has a variety of fauna. One of them is endemic primate of Java Island, Suruli/Javan Grizzled Langur (*Presbytis comata*). This primate was established as one of the protected species by Ministers of Agriculture (Supriatna and Wahyono, 2000; Henri *et al.*, 2017). Currently, *P. comata* experiencing a high threat of extinction because of hunting in nature and habitat destruction. According to Supriatna and Wahyono (2000), *P. comata* habitat has decrease about 96% from 43.273 km<sup>2</sup> into 1.608 km<sup>2</sup>. The shrinking habitat will affect their home range as well as their ability to survive. In addition, depreciation and habitat conversion can also affect the availability of the feed. Javan primates such as *P. comata*, Javan Gibon or Javan Langur face the threat of poaching for illegal trading (Sontono *et al.*, 2016). Poaching in the community is difficult to prevent because of the limited number of officers in the field and the close distance between community settlements and forest areas. Economic factors encourage people's interest in wildlife hunting because the selling price is high enough.

Illegal logging and Forest conversion due to increasing human populations can threaten the existence of the primates. *P. comate* are known to be very sensitive to the changes that occur in their habitat. This condition lead *P. comate* become endangered in the future if their habitat is damaged and poorly managed especially in terms of habitat condition, periodic inventory, and reproductive activities. In addition, community activities within the reserve area by take a certain type of plant for medication or other necessities leads to a decrease feed sources for *P. comata* and narrowing their homerange (Aman, 2002).

*P. comata* is an animal which is active during the day (diurnal) and usually occupy the upper and middle layer of the tree for their daily activities especially for eating. Iskandar (2007) mentioned that in conducting their activities, primates often use middle canopy strata due to the availability of more distributed feed sources and as predator protection strategies. Situ Patengan Nature Reserve area located in Ciwidey West Java is one of the *P. comata* habitat.

Food is one of the most important habitat components for wildlife because food availability affects the reproduction and well-being of the animals. Food factors are categorized as limiting factors because food is a very important resource to meet the basic needs of every living creature, such as breeding, increasing the body's resistance to disease, energy sources, and will have an ef-

fect on reproduction. The availability of food in a habitat, both in terms of quantity and sufficient quality will have a positive effect on the development and growth of wildlife populations within the habitat (Maryanto *et al.*, 2008). Like other folivorous (leaf eaters), most research showed that *P. comata* eat more leaves than fruit (Eliana *et al.*, 2017). While Ruhayat (1983) concluded that *P. comata's* foods are various types of leaves, fruits, flowers, tip of stems and others.

*P. comata* will go through their home range area to forage some food. So the diversity of food will affect the wide of their home range. However, information about home range and food preference have not been adequate. In addition, the provision of geographic information-based management of forest resources is also necessary. The spatial technology such as the Global Information System (GIS) was used to provide convenience in the management area especially in order to obtain information about the home range of *P. comate* at Region of Situ Patengan Nature Reserve.

Home range area and food preference are some important ecological information especially for species with decreasing habitat, because decreased habitat area can be affecting food availability and their survival ability. These ecological information can be used in habitat and population management to conserve *P. comata*.

## METHODS

This research was conducted at Situ Patengan Nature Reserve, Ciwidey, West Java. Situ Patengan has an area of 86.18 Ha consists of Nature Reserve area (65Ha) and Nature Tourism Park (21.18Ha). There were three blocks of area observed (Cirengganis, Balkasap, and Legok Meong). This research was held from May to August, 2015.

The materials used for the observations in the field are including Map area of Situ Patengan Nature Reserve, binoculars, the Global Positioning System (GPS) Garmin 60CSx to determine the coordinates of the observation range area, Canon 600D SLR camera, the 55-250mm lens, plant identification book (Flora Mountains of Java, Van Steeins and Free Tree Indonesia) as a reference in identifying the types of plants consumed by *P. comata*, thermometer, Tally sheet as a tool to record data during field observation, data processing software for the comprehensive analysis of range area used Software Lyon QGIS version 2.12.

*P. comata* population was calculated by di-

rect calculation in the field (direct census). The application of this method was done by divided the area into several blocks (block counts) and counted the number of individuals in each block in sequence (Tobing, 2008).

Calculation of the number of *P. comata* encountered was based on the age group. Adult (> 6 years) female characteristics were generally seen to have large nipples and most of them carried their babies. Adult males have large bodies and make loud noises. Subadult (4-6 years) females were seen from nipples that have grown but not enlarged yet. While the subadult males have a smaller body compared to adult males. Juvenile (9 months – 4 years) in *P. comata* were very difficult to distinguish based on their genitals. Juvenile body shape almost resembles the baby's body size. They were able to move on their own and not in the sling. Infant (< 9 months). Infants were easily distinguished from other age groups of *P. comata* because this group has a small body size and still in their parent sling.

In determining the home range of *P. comata*, we selected and followed an individual in each group to representing the *P. comata* group. Then we determined the location coordinate point by using the GPS. Each observed group was labeled a name in a tabular table which was an alphabetical letter indicating the location on the map of where each group was found. Observation of the home range was carried out for five days per group. Observation was conducted at 06.00-18.00 WIB. Home range area was determined by the minimum convex polygon method in order to link the coordinates of the outermost of the whole area roaming groups (Boitani and Fuller, 2000 in Fitri, 2013). Home range of *P. comate* was mapped by creating a polygon of outer points of GPS coordinates.

Observation of plant food preferences was conducted by using Focal animal sampling and Ad-libitum methods (Altman, 1974). Focal animal sampling method is a method that focuses on the individual observations as a sample in order to facilitate the observation field. The method was applied to obtain data food preferences in detail.

Data calculations of *P. comate* food palatability was used to determine the preferences of food. The calculation is as follows:

$$CF_x = \frac{A}{B} \times 100\%$$

Description

A: Total consumption of x (plant species)

B: Total consumption of all plant species

$CF_x$  : Consumption frequency of x (plant spe-

cies).

## RESULTS AND DISCUSSION

### Population

Population is a reflection of the number of individual organisms that inhabit a region at any given time. The population of *P. comata* in different areas will differ according to the number of *P. comata* groups inhabiting the area and the number of individuals belonging to the group. Below is one of the picture of *Presbytis comata*.

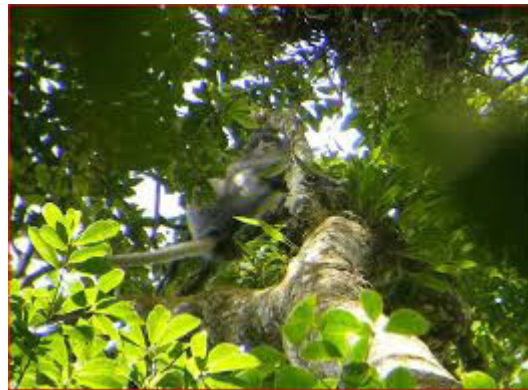


Figure 1. *Presbytis comata*

Based on observations, two groups of *P. comata* and one solitary individual were found in the Cirengganis block, a group of *P. comata* was found in the Balakasap block, and one group was found in the Legok Meong block. So there had been found as many as four groups of *P. comata* with a number of individuals as many as 22 individuals and one solitary individual. So the number of *P. comata* found in Situ Patengan Nature Reserve were 23 individuals in total. Information on the number and composition of the *P. comata* group in the Situ Patenganis served in Table 1.

The calculation of *P. comata* group in the study sites showed that this species lived in a relatively small group of individuals with 4-9 members in each group. This result was not much different compared to research conducted by Putra (1993) which stated that *P. comate* at Situ Patengan Nature Reserve consisted of 3-8 individuals per group with a social organization of the group led by a male adult. The table above shows that there are two groups and one solitary individual found in the Cirengganis block, one group in Balakasap, and one group in the Legok Meong block. The solitary individual allegedly a group member that left the group due to competition. The calculation of the composition of the *P. comata* group was performed when the individual moves or rests in the gap between the tree canopy

**Table 1.** The number and composition of the *P. comata* group in Situ Patengan Nature Reserve

| Group    | Number and Composition |    |     |     |   |   | Total individuals | Block       |
|----------|------------------------|----|-----|-----|---|---|-------------------|-------------|
|          | AM                     | AF | SaM | SaF | J | I |                   |             |
| A        | 1                      | 1  | -   | 1   | 1 | - | 4                 | Cirengganis |
| B        | 2                      | 3  | 1   | 1   | 1 | 1 | 9                 | Cirengganis |
| C        | 1                      | 2  | -   | 1   | 1 | - | 5                 | Balakasap   |
| D        | 1                      | 1  | 1   | -   | 1 | - | 4                 | Legok Meong |
| Solitary | 1                      | -  | -   | -   | - | - | 1                 | Cirengganis |
| Total    | 5                      | 7  | 2   | 3   | 4 | 1 | 23                |             |

Description:

AM = Adult Males      AF = Adult Female

SaM = Subadult Males    J = Juvenile

SaF = Subadult Females    I = Infant

that they attended.

On this research, Sex ratio was determined only on sub adult and adult age class, because sex characteristics on juvenile and infant was difficult to observe (Supartono, 2001). Sex ratio of subadult male and female was 1: 1.5. While sex ratio of adult male with female was 1: 1.4. Despite the slight difference, it can be seen that the female individuals of both subadult and adults were more than the male individuals. It showed that the *P. comate* was a polygamous animal. Similar with Surpriatna and Wahyono (2000) opinion, that *P. comate* was a polygamous animal with the group composition consist of one male (One male troop), more than one female, and offspring. Nijman (2017) found 55 groups of *P. comata*, most groups consisted of one male, multi females and offspring, and two groups consisted of one male one female and offspring. In this research, most groups consisted of one adult male and one until three adult female and several sub-adults, juveniles and infants. This study also found one special group that consisted of two adult males, multi female and offspring. This special group composition was uncommon in *P. comate* but it was recorded in their close species *Presbytis aygula* (Ruhayat, 1983). According to Bismark (2009), factors affecting the number of individuals in the group are the food and environmental resources that make it possible to nurture the child well. Chalmers (1979 in Supartono, 2001), suggested that factors affecting the population are birth, death, emigration, immigration, and the ability to survive in group competition.

**Home Range**

Home range is the area where the animal lives (Alikodra, 2002). Generally, home range is some area that passes when the animal doing their daily activity, foraging and marking territo-

ry. The *P. comate* estimated home range in the Situ Patengan Nature Reserve have various width. Sequentially, the home range width of group A was 3.52 ha, Group B 4.43 ha, Group C 3.76 ha, Group D 3.14 ha, while the home range width of solitary individual was 2.64 hectares. Distribution and home range area of *P. comata* in the Situ Patengan Nature Reserve is presented in Figure 2.



**Figure 2.** Home Range of *P. comata* in Situ Patengan Nature Reserve, Ciwidey, West Java.

Group of *P. comata* found at Situ Patengan Nature Reserve have various extension of home ranges. Recent research on the *P. comata* home range in Situ Patengan are a conducted by Putra (1993) showed a larger home range area compared to the results of this study (7.7 Ha). The variety of home range can be affected by food availability. In line with the study on *Presbytisru bicunda* in Borneo by Hanya and Bernard (2012) that showed that seasonal food availability can modify the home range pattern. Berliana (2013) also stated that an extensive home range can be influenced by the availability of food resources. Jildmalm *et al.* (2008) stated that most primates spend most of their time searching for food in home range areas, So more food is available the less the home range area becomes.

On this study, it was alleged that *P. comata* food source in Situ Patengan area has fulfilled the daily energy needs. So the home range of each group is not too extensive. When moving from one branch to another branch, usually *P. comate* is jumping or walking with four limbs. Supriatna (2006) stated that there was occasionally an overlap in the home range of one group of *P. comatas* with other *P. comata* groups. Groups of 4-19 individuals generally occupy a home range of about 9-20Ha.

**Food plants preferences**

This study found 27 species of plants from 16 families that were directly consumed by *P. comata*. Information of plants preferences as food is presented in Table 2.

Selection of the food preference can show what kind of feed is most preferred by *P. comata* as well as the most disliked food. In addition, the level of preference types of food can be determined by counting the number of feed intake (palatability).

Karyawati (2012) stated that primates tend to choose the foods they like. In Situ Patengan nature Reserve, *P. comata* food sources were dominated by the family of Fagaceae. In Table 2, it can also be seen that *P. comata* more often consume leaves of Ki hiur (*Castanopsis javanica*) with a feeding preference percentage of 10.07%, fruit and leaves of Saninten (*C. argentea*) 9.35%, fruit and leaves of Kalimorot (*C. tunggurut*) and Beletebe (*Sloneasigun*) with a percentage of 7.91%, and fruit and leaves of Pasang (*Quercus* sp) with

**Table 2.** Food plants preferences

| Species                       | Family          | Part Consumed | Preference (%) |
|-------------------------------|-----------------|---------------|----------------|
| <i>Saurauia Bracteosa</i>     | Actinida-ceae   | fruit, flower | 3.59           |
| <i>Pandanus</i> sp            | Agalaceae       | leaf          | 1.43           |
| <i>Macropanax dispersum</i>   | Araliaceae      | Leaf, flower  | 6.47           |
| <i>Schefflera variegata</i>   |                 | leaf          | 2.87           |
| <i>Glachidion album</i>       | Euphorbia-ceae  | leaf          | 0.71           |
| <i>Castanopsis tunggurut</i>  | Fagaceae        | fruit, leaf   | 7.91           |
| <i>Castanopsis javanica</i>   |                 | leaf          | 10.07          |
| <i>Quercus</i> sp             |                 | fruit, leaf   | 7.19           |
| <i>Castanopsis argentea</i>   | Junglanda-ceae  | fruit, leaf   | 9.35           |
| <i>Mussaenda frondosa</i>     |                 | leaf          | 2.87           |
| <i>Litsea angulata</i>        | Lauraceae       | leaf          | 5.03           |
| <i>Manglietia glauca</i>      | Magnolia-ceae   | leaf          | 5.03           |
| <i>Ficus heterophylla</i>     | Moraceae        | fruit, leaf   | 0.71           |
| <i>Ficus fistulosa</i>        |                 | fruit, leaf   | 4.31           |
| <i>Ficus pubinervis</i>       |                 | leaf          | 5.03           |
| <i>Cattleya</i> sp            | Orchida-ceae    | leaf          | 0.71           |
| <i>Dendrobium</i> sp          |                 | leaf          | 0.71           |
| <i>Smilax leucophylla</i>     | Smilaceae       | leaf          | 1.43           |
| <i>Passiflora edulis</i> Sims | Passiflora-ceae | leaf          | 1.43           |
| X sp                          | Passiflora-ceae | leaf          | 0.71           |
| <i>Podocarpus imbricatus</i>  | Podocarpaceae   | leaf          | 5.75           |
| <i>Rubus moluccanus</i>       | Rosaceae        | leaf          | 0.71           |
| <i>Engelhardia spicata</i>    | Rubiaceae       | leaf          | 2.15           |
| <i>Canthium glabrum</i>       |                 | leaf          | 1.43           |
| <i>Cinchona succirubra</i>    |                 | leaf          | 1.43           |
| <i>Schima wallichii</i>       | Theaceae        | leaf, flower  | 2.87           |
| <i>Sloneasigun</i>            | Tiliaceae       | fruit, leaf   | 7.91           |

the percentage of 7.19%. Those selection of feed is likely to be based on the taste of *P. Comata* that like plants with green foliage, high moisture content and softer foliage texture. According to Prayogo (2006), all species of primate prefer material with light green or bright color which contain more nutrients, soft structure that good for their digestionsuch as young leaves and fruits.

Research on the estimation of *P. comata* population has not been done for a long time. On the other hand, these data are needed in order to monitor their population in nature so that their conservation status can be determined and updated. The results of the study are expected to provide some information to relevant agencies or government in order to protect the habitat area of *P. comata*as well as to maintain the vegetation that has become their source of feed.

## CONCLUSION

The home range of *P. comata* groupsat The Situ Patengan Nature Reserve are varied. The home range of group A, B, C and D are covering 3.52 Ha, 4.43 Ha, 3.76 Ha, and 3.14 Ha respectively, while the solitary individual of *P. comata* has a home range covering 2.64 Ha. Based on the observation, there were 27 species from 16 families of plants that was directly consumed by *P. comata*. Of the 27 species of plants, *P. comata* more often consume *Castanopsis javanica* (10.07%), *C. argentea* (9.35%), *C. tungurut* (7.91%), *Sloneasigun* (7.91%), and *Quercus* sp (7.19%).

More research is needed to do about *P. comata* home range in various locations both in the highlands and low to determine different aspects and need to do further research about feed preference to know the contents of feed so we can know the nutritional value of feed *P. comata* in Situ Patengan Nature Reserve.

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