

## Individual Behavior Of Female Sumatran Orangutan (*Pongo abelii* L.) With Enclosure Management System In Siantar Zoo

Arlen Hanel John<sup>1</sup>, Mohammad Arief Syarifuddin<sup>2</sup>,

<sup>1</sup>, Departement of Biology, Faculty Mathematics and Natural Science, Universitas Sumatera Utara, Jalan Bioteknologi No. 1 Kampus, Padang Bulan, Medan 20155, Sumatera Utara, Indonesia

<sup>2</sup>Undergraduate student, Departement of Biology, Faculty Mathematics and Natural Science, Universitas Sumatera Utara, Jalan Bioteknologi No. 1 Kampus, Padang Bulan, Medan 20155, Sumatera Utara, Indonesia

**Abstract.** Sumatran orangutans (*Pongoabelii* L.) is an endangered species due to habitat destruction. Conservation strategies need to be done in preventing extinction of orangutans, such as ex-situ conservation in Siantar zoo. This study aims to determine the behavior of individual male orangutan at Siantar Zoo with a management system. The observatuons was conducted for 14 days in August with the Focal Animal Sampling method, data recorded using the Instantaneous method and descriptive data using the Open Ended interview technique. The results showed the overall frequency of individual male orangutan behavior were locomotion (33,43%), resting (27,36%), eating (25,24%), playing (9%), agonistic (3,64%), self care (0,83%) and pooping (0,5%). The behavior of individual male orangutan is influenced by the number of visitors, namely the locomotion behavior of the crowded visitor category (34,37%), medium (30,31%) and quiet (33,18%). The resting behavior of crowded visitor category (25,02%), medium (28,19%) and quiet (27,44%). The eating behavior for crowded, medium and quiet categories was 25,96% ; 25,47% and 26,30%. The playing behavior in crowded, medium and quiet categories is 7,96% ; 7,71% ; 9,75%. Agonistic behavior in crowded categories (5,44%), medium (7,11%) and quiet ( 1,96%). Self-care behavior for crowded,medium and quiet categories was 0,64% ; 0,83% ; 0,88%. The pooping behavior in the crowded category is 0,59%, in the medium category is 0,38% and in the quiet category is 0,49%. The management system for male orangutan at Siantar Zoo already has a fairly good and regular system. The cage management has met the minimum requirements and the male orangutan has a optimal body weight and has never been infected with a serious disease.

**Keyword:** Male sumatran orangutan, Individual behavior, Siantar zoo

Received 10<sup>th</sup> June 2021 | Revised 20<sup>th</sup> July 2021 | Accepted 30<sup>th</sup> August 2021

### 1. Introduction

Orangutans are the only great apes found in Asia, precisely on the islands of Sumatra and Kalimantan. In Sumatra, there are two species of orangutan, namely the Sumatran Orangutan (*Pongo abelii*) which is limited to the northern part of the island of Sumatra (Aceh and North

\*Corresponding author at: Departement of Biology, Faculty Mathematics and Natural Science, Universitas Sumatera Utara, Jalan Bioteknologi No. 1 Kampus, Padang Bulan, Medan 20155, Sumatera Utara, Indonesia

E-mail address: a arlenjohn59@gmail.com

Sumatra Province) [1], and the Tapanuli Orangutan (*Pongo tapanuliensis*) which is found in the forest. Batang Toru, while in the Kalimantan area there is only one species, namely *Pongo pygmaeus* [2]. The population of the Sumatran orangutan (*Pongo abelii*) has decreased from year to year, the main cause being habitat destruction due to illegal logging, forest fires and poaching [3]. Based on data obtained in 2004 it was estimated that around 7,500 individuals [4] and in 2007 decreased to 6,667 individuals, of whom were in Gunung Leuser National Park (Suaq Balimbing, Ketambe, Tangkahan, Bukit Lawang, Sampan Getek, Rawa Singkil, Agusan, Rawa Tripa, Ulu Masen, Jantho Nature Reserve, and others), as well as Batang Toru and Pakpak Bharat [5]. In the last few decades, the decline in the orangutan population is estimated at 30-50% [6], even more than 80% when compared to the orangutan population in the last 75 years [7]. Overcoming the decline in the orangutan population, it is necessary to develop an orangutan conservation strategy to preserve and protect orangutans from extinction. The best long-term conservation strategy to maintain the orangutan population is the protection of natural populations and natural communities in the orangutan's natural habitat, known as in-situ conservation. However, the high level of human activity against forest destruction and encroachment of wild nature which directly threatens the existence of orangutans in their natural habitat has hampered in-situ conservation efforts [8]. One of the other efforts to prevent the extinction of endangered species is by maintaining natural individuals in controlled conditions and under human supervision, known as ex-situ conservation. Ex-situ conservation institutions in the North Sumatra area include the Siantar Zoo. Siantar Zoo has many types of endemic animals that make the animal park an area for public education on key species that are closely related to the balance of ecosystems in nature. One of them is the Sumatran orangutan, which is an endemic animal that is a key species in its natural habitat. Siantar Zoo has 1 (one) juvenile male orangutan, aged  $\pm 9$  years, named Steve, and has been at the Siantar Zoo since 2012. Steve was initially placed in a cage until 2017, then the zoo Siantar animals have changed the shape of the cage to be semi-open (enclosure) until now, this situation will affect the behavior of individual orangutans [9]. [8] stated that differences in cage conditions can have a bad or good impact on the behavior and life of orangutans. Lack or poor quality of food sources, facilities and areas that are not large enough to support the survival given to orangutans will cause stress, obesity, and even death for orangutans. Furthermore, it was explained that changes in behavior that occur outside of nature due to environmental factors can also cause orangutans to lose their natural nature, especially for male orangutans who are more solitary than females. Therefore, it is necessary to conduct research on the behavior of individual male orangutans with a management system at the Siantar Zoo as an effort to preserve the

Sumatran orangutan. Information regarding the behavior of the individual male orangutan (Steve) at the Siantar Zoo is still limited

## **2. METHODS**

The study was conducted in August 2020 for 14 days, with a period of 6 hours (10.00 to 16.00 WIB) per day at the Siantar Zoo, North Sumatra Province. The object of this research is a male Sumatran orangutan named Steve who is  $\pm 9$  years old. Steve has a height of  $\pm 135$  cm and a weight of  $\pm 58$  Kg. This research was conducted using the Focal Animal Sampling method, namely in a certain period or time using one individual as the object of research, his behavior was observed. Observations were made within 2.5 m of the Sumatran orangutan enclosure. Recording of orangutan behavior data using the Instantaneous method, namely recording the behavior seen in orangutans at certain times and periods using a tally sheet table. Observation of the behavior of individual orangutans in this study was carried out starting when the orangutan was removed from the resting cage (in holding) by the keeper to the open cage (enclosure) which was around 10.00 WIB until 16.00 WIB (afternoon) before being put back into the holding according to the routine schedule at the Siantar Zoo). This research was conducted every day for 14 days with the time of recording each individual behavior in two minutes on the data tabulation.

The individual behavior data in this study was based on the ethogram/behavioral table that had been created and adopted from Morrogh-Bernard et al., (2002) regarding "Standards for Orangutan Data Collection" namely observing and recording :

1. Category of Eating Behavior (M), regarding eating activities that begin to be counted since the individual begins to show the behavior of looking for or holding food and ends when the individual changes resting behavior, with sub categories:
  - a. Choosing (Md), which is an activity that starts when the orangutan moves to a hidden place feed and then shows a choice behavior
  - b. Taking (Mb), namely the action of orangutans taking and holding food with the palm of the upper arm or the palm of the forearm
  - c. Processing (Mg), seen from the way orangutans treat food before putting it in the mouth
  - d. Eating from visitors (Mp), namely the action of orangutans when catching and eating food thrown by visitors.
2. Movement Behavior Category (G): regarding the movement of orangutans, with sub categories:
  - a. Quadrupedal (Q), which is moving from place to place using all four of its locomotion.

- b. Bipedal (Bi), which is moving from place to place using both locomotion (legs)
  - c. Climb (C), which is done by holding the object (tree trunk) with the four tools of motion and then moving in a vertical direction.
  - d. Brachiation/swinging (Br), which is changing places using the second or fourth locomotion tools alternately through a swing rope.
3. Play Category (P), which consists of sub categories:
- a. Play by moving the body.
  - b. Play by utilizing existing objects.
4. The category of disposing of waste, which consists of sub categories:
- a. Urination (UR), which is the activity of removing urine.
  - b. Defecation (DF), which is the activity of removing feces.
5. Rest Category (I): regarding all rest behavior carried out, with sub categories:
- a. Sitting (Id), which is positioning the body by resting on the buttocks
  - b. Standing (Ib), which is positioning the body upright resting on both feet
  - c. Lying (Ig), which is positioning the body resting on the back / side of the body
  - d. Sleep (Ir), which is complete rest/closed eyes
6. Category Agonistic (Ag), namely behavior related to the aggressive nature of orangutans, with categories:
- a. Spitting (ml), namely the behavior of spitting at visitors
  - b. Kiss squeak (Ks), namely the behavior of making noise to visitors
  - c. Fighting (mw), namely behavior against visitors.
7. Self-care category: regarding all self-cleaning behavior with sub categories:
- a. Scratching body (SB)/ grooming, which is the activity of scratching the body
  - b. Lick (L), namely body licking activities.

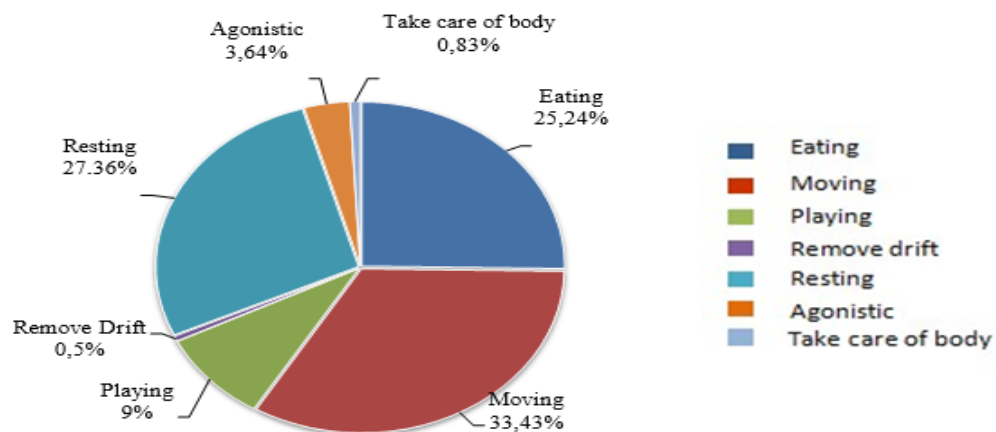
The data on the behavior of the individual orangutans as the object of observation were then tabulated and the presentation determined using the formula used in the previous study by [10], as follows

$$\text{Behaviour category} = \frac{\text{Behaviour frequency}}{\text{total frequency of all behaviour}} \times 100 \quad (1)$$

### 3. Result and Discussion

#### 3.1. General Behavior of Male Orangutans at Pematangsiantar Zoo

The results of the research that has been carried out on the individual behavior of male orangutans (Steve) are grouped into seven behavioral categories which show different percentages of frequency in each behavior category. The percentage of the frequency of Steve's individual behavior in general at the Zoo can be seen in the following :



**Figure 1.** Diagram of the frequency of individual behavior of male Sumatran orangutans in general at the Siantar Zoo

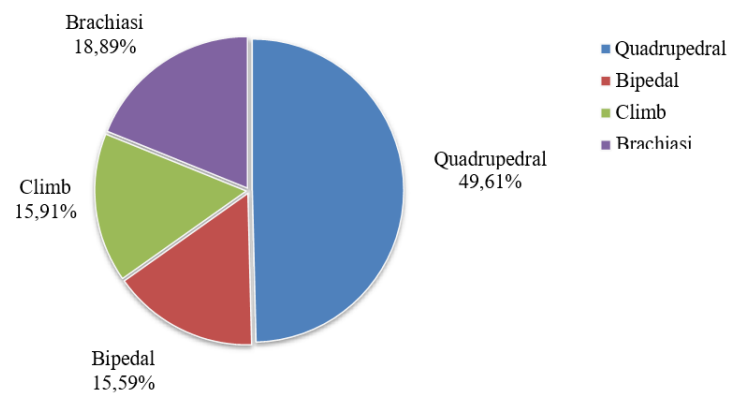
From Figure 1. it can be seen that the percentage of the frequency of individual behavior of male orangutans that is often carried out, namely moving behavior is 33.43%, then followed by resting behavior by 27.36%, eating behavior by 25.24% and playing behavior by 9%, while the least performed, namely agonistic behavior of 3.64%, self-care behavior of 0.83% and behavior of removing feces by 0.5%.

The movement behavior carried out by male orangutan Steve at the Siantar Zoo, such as moving from one place to another by walking on the ground, swinging to pick up food on the floor around the cage and climbing was obtained by 33.43%. This shows that the male orangutan Steve at the Siantar Zoo at the time of this study was seen to

be more active in moving behavior. This situation is also influenced by the factor of providing enrichment in the form of a replica of the model tree and also the age and sex factor of Steve's orangutan who has entered adolescence. Ginting (2006) explains that the high percentage of moving of orangutans in ex-situ conservation areas shows that these orangutans have shown their natural nature, especially for foraging.

### 3.2. Movement Behavior

Movement behavior which includes 4 (four) sub-categories consisting of Quadrupedal, Bipedal, Climb, and Brachiation, the highest was obtained, including the Quadrupedal subcategory, and followed by the Brachiation, Climb, and Bipedal subcategories as shown in Figure 2. below.



**Figure 2.** Percentage diagram of the behavior of the mobile subcategory of male Sumatran orangutans at the Siantar Zoo.

In Figure 2, it can be seen that the percentage of movement categories carried out by male orangutan Steve from the highest to the lowest in a row, namely quadrupedal behavior or walking using all four locomotion tools (hands and feet) is 49.61%.

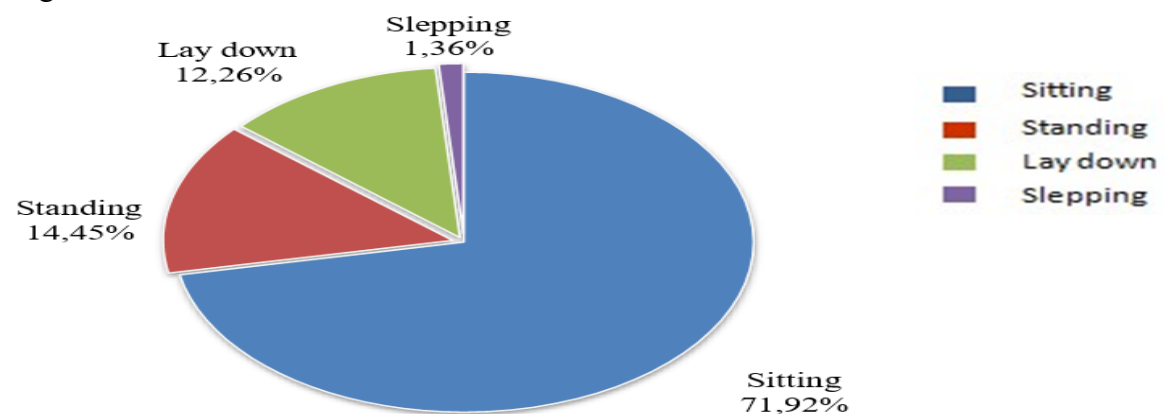


**Figure 3.** Movement behavior with quadrupedal

Quadrupedal behavior or walking using four locomotion is the highest frequency of behavior category performed, it means that of the four ways of moving that Steve most often does is how to walk using his four locomotion tools (Figure 3). This is in accordance with the statement of [12] that Sumatran orangutans in zoos more often carry out locomotion activities or move places by walking on the ground. In addition to walking, the Sumatran orangutan also moves by means of brachiation or swinging by 19%, climbing or climbing by 15.91%) and bipedal by 15.59%.

### 3.3. Resting Behavior

Resting behavior which includes 4 (four) subcategories consisting of sitting, standing, lying down and sleeping, was found to be the highest among the sitting subcategories, and followed by standing, lying and sleeping subcategories as shown in Figure 4.



**Figure 4.** Diagram of the percentage of resting behavior subcategories in male Sumatran orangutans at the Siantar Zoo.

In Figure 4. it can be seen that the percentage of male orangutan resting behavior subcategories from the highest to the lowest, respectively, is sitting behavior (71.92%), followed by standing behavior (14.45%), lying behavior (12.26%). ), and sleep behavior 1.36%



**Figure 5. (a) Lying rest behavior (b) Sitting rest behavior**

Rest behavior is an inactive individual state which includes sitting, sleeping or lying down [13]. According to [14], the resting position of the orangutan is also influenced by the age of the orangutan. The male orangutan Steve, who is classified as a teenager, mostly engages in resting



behavior by sitting, lying down, and occasionally hanging. According to [8] juvenile male orangutans spend their rest time sitting, hanging and lying down. This situation shows the high percentage of sitting done by male orangutans Steve. This is because sitting activity is a condition for orangutans to take a temporary break during the day. According to [12], an orangutan's temporary rest activity is a state of orangutans who are silent in one place between other activities, both sitting and lying positions which can be affected by temperature and weather.

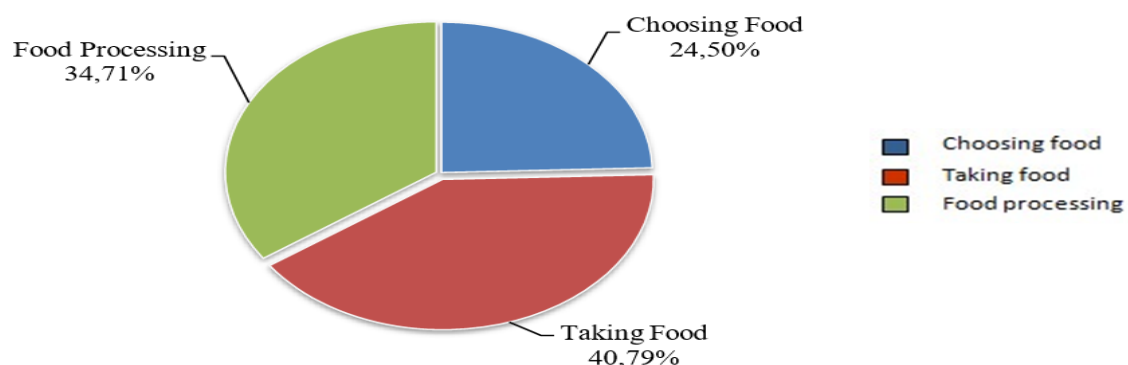
### 3.4. Eating Behavior

Feeding behavior includes 3 subcategories consisting of the behavior of choosing feed, taking feed, and processing feed which is the highest obtained among them, subcategories of taking feed, processing feed and choosing feed.



**Figure 6.** Diagram of the percentage of feeding behavior in male orangutans at the Siantar Zoo.

From Figure 6. it can be seen that the percentage of feeding behavior subcategories in male orangutans that are often carried out is the behavior of taking 40.79% followed by feeding behavior of 34.71%, and feeding behavior of 24.50%. the highest frequency of eating behavior subcategory, it means that of the three ways of eating behavior Steve is most often done by taking feed.





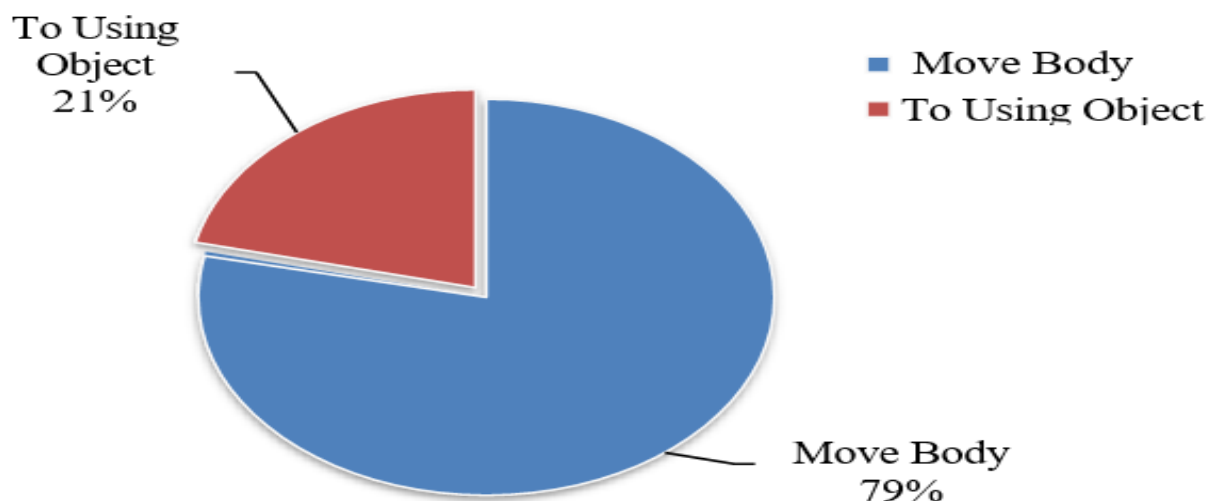


**Figure 7.** Orangutan (steve) selects and takes available feed

According to [12] taking food is part of the eating behavior of orangutans to get food that falls to the ground or a flat stucco area accompanied by moving behavior. After that, the male orangutan Steve will process the feed such as peeling and cleaning the feed and then chewing and swallowing the feed.

### 3.5. Playing Behavior

Play behavior includes the movement of orangutans playing alone by moving their bodies and playing with objects without any interaction with other individuals. The percentage of behavior in this playing subcategory can be seen in Figure 8.



**Figure 8.** Diagram of the percentage of play behavior in male Sumatran orangutans at the Siantar Zoo.

From Figure 8. it can be seen that the percentage of play behavior in Steve is more dominated by the behavior of moving his own body by 79% while playing behavior using objects is 21%. According to [15], orangutan play behavior is categorized as playing alone and playin socially,

playing alone is usually done around moving the body and playing with objects around. During the observation, it was recorded that the male orangutan Steve occasionally moved while rolling on the ground. This rolling behavior was included in the subcategory of body-moving play which was carried out when Steve's male orangutan picked up food on the floor. Apart from rolling, Steve's male orangutan also played with objects.



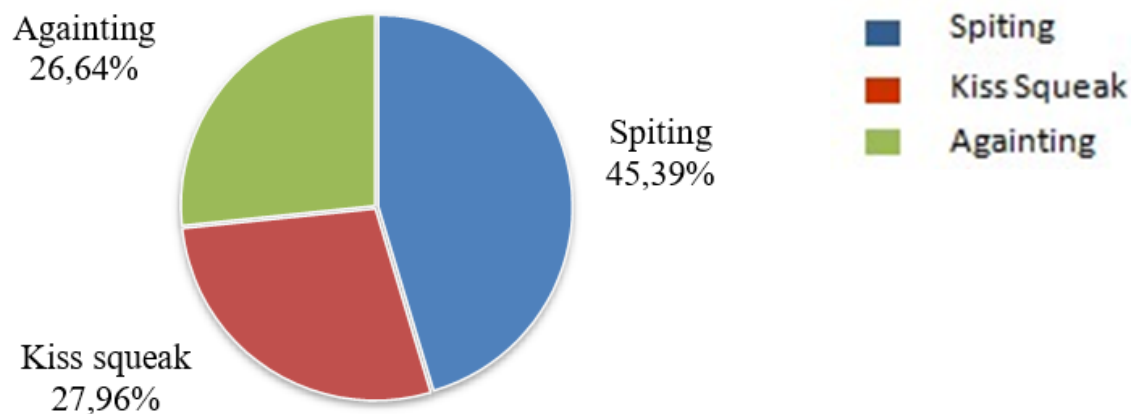
**Figure 9.** (a) Orangutan (Steve) playing with plastic (b) Orangutan (Steve) takes a drink using a plastic bottle from the water pool.

The behavior of playing using objects includes using plastic and used bottles as a means of playing with Steve's male orangutan, such as putting his hand in plastic. This situation is because the demonstration cage is being thrown at by irresponsible visitors.

According to [12], juvenile orangutans at the Kasam Kulim zoo often use waste such as plastic food and drink bottles as a means of playing. It was recorded that once in a while, Steve's orangutan was seen drinking water in the pond using an old plastic bottle and then taking him to an artificial tree and playing with the object.

### **3.6. Agonistic Behavior**

Agonistic behavior includes 3 (three) subcategories consisting of spitting, kissing squeaking and fighting visitors, the highest is spitting, followed by kissing squeaking and fighting visitors, as shown in Figure 10 below.

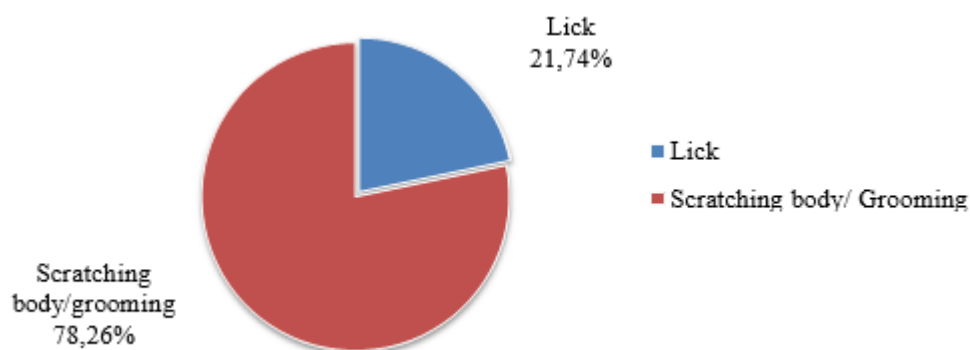


**Figure 10.** Diagram of the percentage of agonistic subcategory

From Figure 10, it can be seen that the percentage of agonistic behavior in male orangutans from highest to lowest, namely spitting behavior of 45.39%, kissing behavior or making sounds like kissing 27.96% and behavior against visitors 26.64%. According to [9], Spitting behavior is the behavior of issuing liquid from the mouth to targets such as keeper or visitors. During the observation, it was recorded that the male orangutan, Steve, often spat at visitors. According to [12], the spitting behavior of orangutans is a sign or code to get food and as a form of communication or introduction to new visitors and keepers.

### 3.7. Self-care behavior

Self-care behavior is the second lowest behavior (figure 4.1) of the seven individual behavior categories of Steve's male orangutan. Self-care behavior includes licking or licking and Scratching body/Grooming or scratching which is the highest, including licking and followed by subcategories which can be seen in Figure 11.



**Figure 11.** Percentage diagram of self-care behavior in male Sumatran orangutans at the Siantar Zoo.

From Figure 11. it can be seen that the percentage of self-care behavior in male orangutans is more dominated by scratching body/grooming behavior, which is 78.26% when compared to body licking behavior which is only 21.74%. According to Purnawan et al., (2016) orangutans generally scratch their bodies (grooming) themselves at rest or after defecating during the day and in the evening when they want to sleep. Grooming behavior is one of the activities that is often carried out with the aim of cleaning oneself from dirt or parasites attached to the orangutan's body. Steve is seen doing grooming behavior on the back and hands in between his resting behavior (Figure 12)

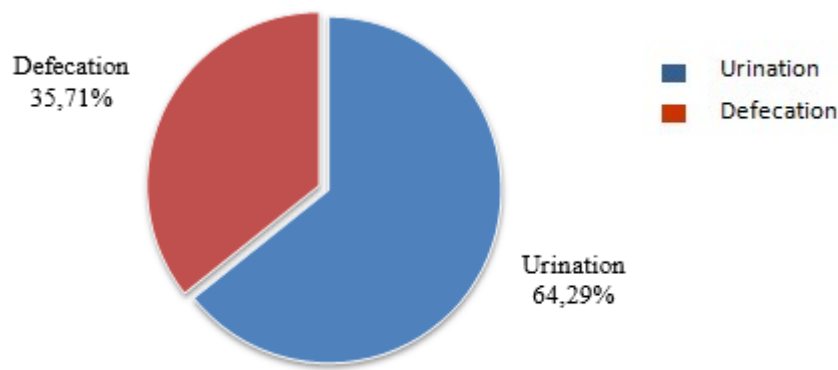


**Figure 12.** (Steve) grooming behavior on the sidelines of his activities

According to [14], grooming behavior is mostly carried out on the hands and feet of orangutans. Meanwhile, lick behavior is mostly carried out on injured body parts. According to [9], the behavior of licking body parts with the tongue is one of the efforts to accelerate wound healing because of the saliva content and also to clean orangutans. Licking behavior is a behavior that results from learning from a certain condition that allows the orangutan instinct to take care of itself. Meanwhile, under observation, male orangutan Steve performed a licking behavior to clean himself and did not appear to be injured at all.

## **8. Disposal Behavior**

The behavior of defecating is the behavior with the lowest percentage of the seven categories of individual behavior. The percentage of defecation behavior includes defecation and urination which can be seen in Figure 13.



**Figure 13.** Percentage diagram of the subcategory of defecation behavior in male Sumatran orangutans at the Siantar Zoo.

From Figure 13. it can be seen that the percentage of the subcategory of defecation behavior in male orangutans is dominated by urination or urination behavior by 64.29% while defecation or defecation behavior is 35.71%. Steve's male orangutans urinate and defecate regularly every day, usually Steve's male orangutans defecate a few minutes after leaving the holding cage, while Steve's male orangutan urination is usually done by sitting or standing on the display tree in the morning before noon (Figure 14).



**Figure 14.** Orangutan (Steve) urinating in a sitting position

According to [17], when orangutans come out of their nests in their natural habitat, orangutans have a habit of throwing feces when they are about to start their daily behavior. The way orangutans defecate is usually while hanging with both hands holding branches. This situation is in accordance with [9] 's opinion that orangutans defecate and urinate by squatting on a stick with both hands hanging on a stick.

## Conclusion

From the results of this study, it can be concluded that the percentage of individual behavior frequencies of male orangutans in general at THPS, namely moving behavior is 33.43%, resting behavior is 27.36%, eating behavior is 25.24%, playing behavior is 9%, agonistic behavior is 3.64. %, 0.83% self-care behavior and 0.5% littering behavior.

## Reference

- [1] Groves C, Wilson DE, Reeder DM, 2005. *Mammal Species of the World*. Johns Hopkins University Press. USA.
- [2] Putro HR, 2019. *Ekologi Orangutan Tapanuli (Pongo tapanuliensis)*. Kelompok Kerja Pengelolaan Lansekap Batang Toru. Bogor.
- [3] Meijaard, E., H.D. Rijksen & S.N. Kartikasari. 2001. *Di Ambang Kepunahan, Kondisi Orangutan Liar di Awal Abad Ke-21*. Publikasi the Gibbon Foundation Indonesia: Jakarta
- [4] [PHVA] Population and Habitat Viability Assessment. 2004. *Orangutan*. Laporan Akhir. Workshop tanggal 15-18 Januari 2004. Jakarta
- [5] [DEPHUT] Departemen Kehutanan, 2007. *Strategi dan Rencana Aksi Konservasi Orangutan Indonesia 2007- 2017*. Balai Pustaka. Jakarta.
- [6] Primack, R.B., Supriatna, J., Indrawan., Kramadibrata, P. 1998. *Bio logi Konservasi*. Yayasan Obor Indonesia: Jakarta.
- [7] Singleton I, Wich SA & Griffiths M. 2008. *Pongo abelii*. The IUCN Red List of Threatened Species. Version 2014.1. <www.iucnredlist.org>.
- [8] Suhandi AP, Yoza D, Arlita T. 2015. *Perilaku harian Orangutan (Pongo pygmaeus Linnaeus) Dalam Konservasi Ex-Situ Di Kebun Binatang Kasang Kulim Kecamatan Siak Hulu Kabupaten Kampar Riau*. Jurnal Jom faperta 2(1): 2..
- [9] Naibaho E, 2019. *Perilaku Harian Individu Orangutan Sumatera (Pongo abelii l.) Di Taman Hewan Pematangsiantar*. [Skripsi]. Medan: Universitas Sumatera Utara
- [10] Willyanti F, 2010. *Perilaku Harian Anak Orangutan Sumatera (Pongo abelii) Akibat Adanya Aktivitas Manusia di Pusat Pengamatan Orangutan Sumatera, Bukit Lawang, Taman Nasional Gunung Leuser*. [Skripsi]. Medan: Univeristas Sumatera Utara
- [11] Ginting YW, 2006. *Studi Reintroduksi Orangutan Sumatera (Pongo abelii Lesson, 1872) yang Dikembangkan di Stasiun Karantina Medan dan di Stasiun Reintroduksi Jambi*. [Skripsi]. Bogor: Institut Pertanian Bogor.
- [12] Kurniawan D, Master J, Rustiati EL, 2015. *Perilaku Harian Orangutan Sumatera Pongo abelii) di Taman afari Indonesia, Cisarua Bogor*. *Swasembada Pangan*. 526-532.
- [13] Zhou Q, Wei F, Huang C, Li M, Rendan B, Luo. 2007. *Seasonal Variation in the activity budgets of Trachypithecus francoisi in the Nonggang Nature Reserve, China*. *International Journal of Primatology*. 28: 657-671.
- [14] Harteti S, 2009. *Perilaku Orangutan Kalimantan di Taman Safari Indonesia*. Pusat Diklat Kehutanan
- [15] Murti DB, 2007. *Studi Primatologi Mengenai Adaptasi Orangutan Menyangkut Masalah Perilaku Lokomosi dan Perilaku Sosial di Kebun Binatang Surabaya*. [Skripsi]. Surabaya: Universitas Airlangga
- [16] Purnawan H, Prayogo H, Anwari MS, 2016. *Perilaku Harian Orangutan (Pongo pygmaeus) di YIARI Ketapang, Kalimantan Barat*. *Hutan Lestari*. 4 (4): 628-637.

- [17] Kuswanda W, 2014. Orangutan Batang Toru: Kritis di Ambang Punah. Forda Press. Bogor.