Journal of Sylva Indonesiana (JSI) Vol. 6, No. 01, 2023 | 70 – 78

Nest Characteristics of the Introduced Orangutan at Jantho Orangutan Reintroduction Station, Aceh Besar

Irmayuni[1,3], Onrizal[2]*, and Suwarno[1]

[1]Faculty of Mathematics and Natural Science, Universitas Syiah Kuala (USK), Banda Aceh, Indonesia
[2]Faculty of Forestry, Universitas Sumatera Utara, Jalan Kampus 2 USU Bekala, Kecamatan Pancur Batu, Kabupaten Deli Serdang, Sumatera Utara 20353, Indonesia
[3]Natural Resources Conservation Agency (BKSDA) of Aceh, Banda Aceh, Indonesia

Abstract. Sumatran orangutans (*Pongo abelii*) learned the process of building nests from their mothers and started building nests around the age of 0.5 years. Orangutan nests have the most intricate arrangement of other primate nests. Orangutans built the nest as a place to rest, play, and protect themselves from predators and insect bites such as mosquitoes. Orangutan nests have different locations tailored to the needs and context of the nest trees. The shape of the nest and the position of the nest usually have differences due to differences in sex, age level, and body weight. The research had conducted at the Jantho Orangutan Reintroduction (JOR) Station, Aceh Besar Regency, Aceh Province. It had carried out from January to August 2021. The research method used is purposive sampling. The selected transects are existing (permanent) with FB, RI, and IS coding, which is part of mammalian transects scattered in the Jantho Pine Forest Nature Reserve. Observations were carried out as many as two repetitions in different months. The results showed several classes and nest positions found at the JOR Station. The nest classes found were 1, 2, and 3, while the others were not found. Nests in position 2 were the most founded at the study site, and position 5 was not found. It indicates no orangutan at the study site liked to play on the ground. This study gets four nest shapes, namely single round, flat oval, tiered, and irregularly widened.

Keyword: Jantho, Nest Class, Nest Position, Nest Shape, *Pongo abelii*

Received 16 September 2022 | Revised 19 January 2023 | Accepted 16 February 2023

1 Introduction

Recently, there are three species of orangutans in Indonesia spread across the islands of Sumatra and Kalimantan (Borneo). *Pongo pygmaeus* in Borneo consists of three subspecies (*P. p. pygmaeus*, *P. p. morio* and *P. p. wurmbii*) [1]. Sumatra Island has two species, *P. abelii* [2] and *P. tapanuliensis* [3]. They spread limited to the Batangtoru Landscape. It had estimated the orangutan population in Sumatra was 6,600 individuals in 2015. Furthermore, the population

*Corresponding author at: Faculty of Forestry, Universitas Sumatera Utara, Jalan Kampus 2 USU Bekala, Kecamatan Pancur Batu, Kabupaten Deli Serdang, Sumatera Utara 20353, Indonesia
E-mail address: onrizal@usu.ac.id

Published by Talenta Publisher
ISSN: 2622-5093 e-ISSN: 2622-5158 DOI : 10.32734/jsi.v6i01.9702
Journal Homepage: http://jsi.usu.ac.id

was 14,613 individuals counted after a further survey. This number does not include the population at an altitude of more than 1,000 meters above sea level, which is in an area that has never been surveyed before [4].

In Sumatra, there are two Orangutan Reintroduction Stations, namely Bukit Tiga Puluh National Park in Jambi and Riau Provinces and Jantho Pine Forest Nature Reserve in Aceh Besar Regency, Aceh Province [5]. The Jantho Orangutan Reintroduction (JOR) Station was established based on the Decree of the Minister of Forestry No. 436 dated August 31st, 2010, concerning the Jantho Pine Forest Nature Reserve an orangutan release site inaugurated by the Governor of Aceh on August 28th, 2011. *P. abelii* is semi-solitary and arboreal compared to other great apes because it has a natural predator on land, namely Sumatran tigers [7]. Therefore, the presence of high-level plants is the most important thing for orangutans' daily activities such as nesting [8]-[9].

Orangutans learn the process of building nests from their mothers and start building nests around the age of 0.5 years [10]-[11]. Orangutan nests have the most intricate arrangement of other primate nests. Orangutan nests are built apart from being a place to rest, play, and protector from predators and insect bites such as mosquitoes [12]. Orangutan nests are located differently to suit the needs and environment of the nest trees [4].

The average nest height ranges from 10 to 20 m above the soil or land level [13]. The selection of nest trees is highly selective which is influenced by the availability of building construction materials, the quality, flexibility, and strength of the wood, leaf size, phytochemical properties as well as the height corresponding to the diameter of the nest tree [14]-[15],[7]. Meanwhile, the determination of the diameter of the nest tree is influenced by the presence of predators [16], vegetation conditions, safety factors, and the experience of each orangutan.

The tendency to build orangutan nests is selected in forest locations that have fairly tight canopy connectivity as a preventive measure against predatory predators. Meanwhile, in more open forest conditions, less connected trees were chosen by orangutans for easier access to land and a wider monitoring area to spot predators [17]. The shape of the nest and the position of the nest usually have differences due to differences in sex, age level, and body weight. However, it is not yet known whether there is a difference in the timeframe of release per individual carried out on the ability to make a nest. The objectives of this study were to measure the architectural variations of orangutan nests and assess the structures and patterns of nesting orangutans at the JOR Station.

2 Research Method

2.1 Research Location and Period

This research was conducted at the JOR Station, Aceh Besar Regency, Aceh Province, Indonesia (Figure 1). Data collections were carried out from January to August 2021.

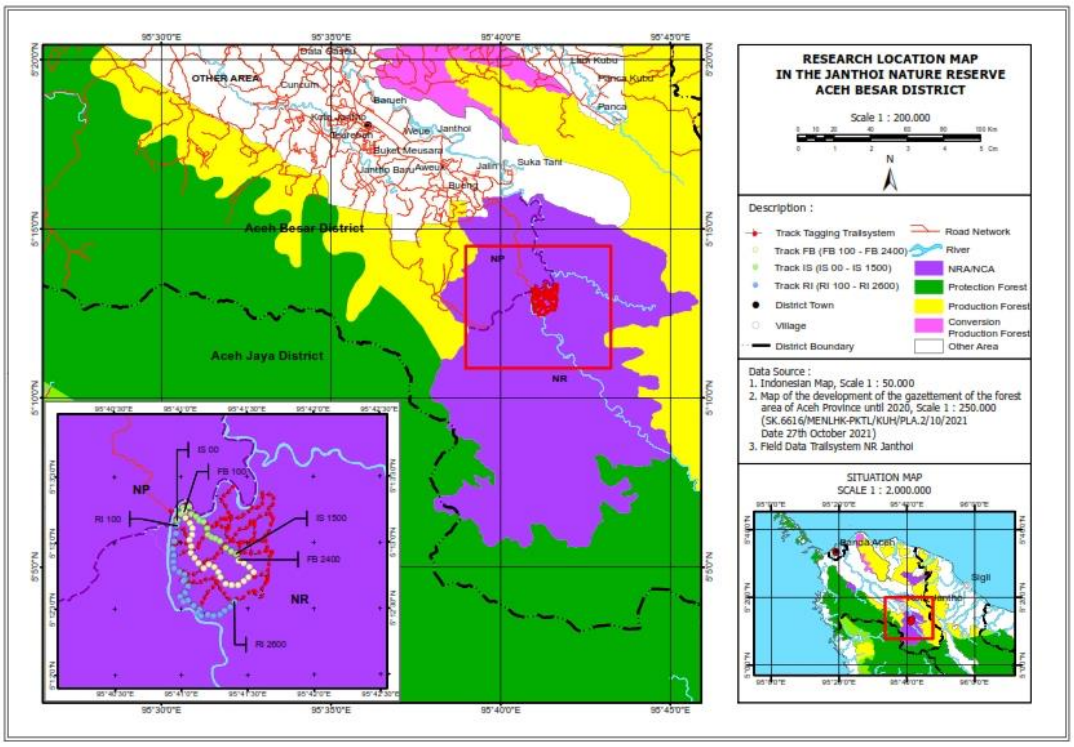

Figure 1 Research location map showing the transect used in Jantho Nature Reserve, Aceh.

2.2 Equipment and Materials

The equipment used includes: (1) for research purposes in the field such as GPS, Rangefinder, compass, soil pH, densitometer, roll meter, camera, binocular, and (2) for data processing and analysis, namely personal computer (PC) with relevant software.

2.3 Data Collection

The method used was purposive sampling. The selected transects are existing (permanent) with the codes FB, RI, and IS coding whose codes are an abbreviation of the names of previous researchers, namely FR for Fitri Basalamah, RI for Rio Ardi, and IS for Ian Singleton. The selected transects are part of mammalian transects scattered in the Jantho Pine Forest Nature Reserve (Figure 1). Data collection was carried out as many as two repetitions in different months. Furthermore, data were taken on each of the moving orangutan routes with 1 km of each path. On each path, set four plots measuring 20 x 20 m, which are taken intermittently (right-left). The data on the shape of the nest is taken by recording the characteristics of the shape, arrangement, and components of a nest.

2.4 Characteristics of orangutan nests

The nest position in the canopy space of the tree is divided horizontally and vertically [10],[18]. Nest positions are divided into five categories as shown in Figure 2.

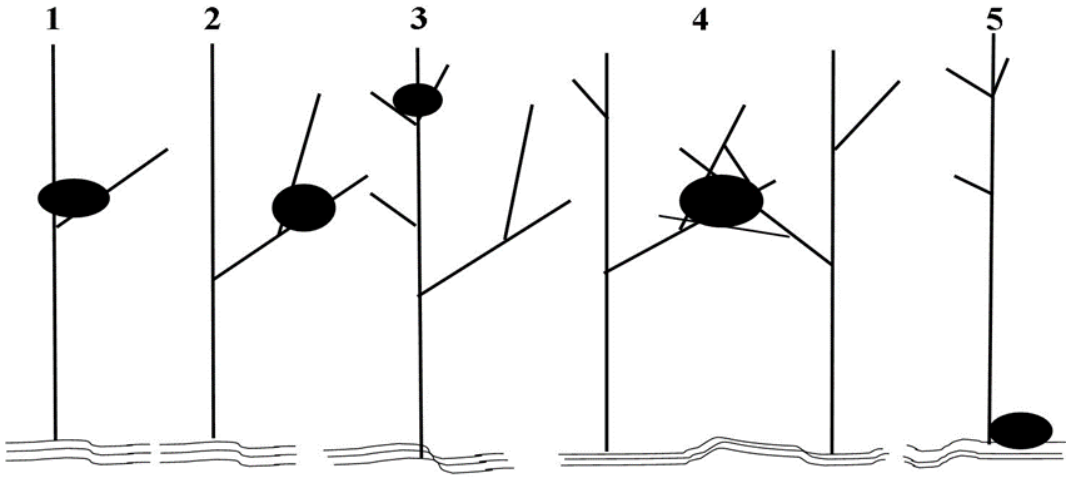

Figure 2 Orangutan nest position categories (black circle). Information: 1st position: at the base of the main branch, 2nd position: in the middle or end of the branch, 3rd position: on the shoots of trees. 4th position: formed from the branches of 2 different trees (the number of trees can be more than 2 different trees), and 5th position: on the ground.

The nest class is a class of damage or destruction of the nest which is divided into four classes to predict these conditions with the following characteristics [19]:

Class 1 : The nest is in the condition of fresh leaves, a new nest, all the leaves are still green.

Class 2 : The leaves have begun not fresh, all the leaves are still there, the shape of the nest is intact, the color of the leaves is already brown, especially on the surface of the nest, there are no visible holes from the bottom.

Class 3 : An old nest, all the leaves are brown in color and even some of the leaves have disappeared and there is already a hole from below

Class 4 : Almost all the leaves are gone; already visible the structure of the branches.

3 Result and Discussion

3.1 Characteristics of orangutan nests

Nests of orangutans are a staple, considering that these animals are arboreal. Several nest-forming requirements must be met to create a nest with safety and comfort for orangutans. Strong branches of the nest tree are needed to support the weight [19]-[21]. Data collected during the study shows the average nests found were in grades 1, 2, and 3. The nested class is a measure of nest damage [19]. The orangutan nests found in the Jantho Nature Reserve area are quite diverse ranging from Classes 1, 2, and 3. The discovery of various nest classes in the three

transects shows that orangutan activity tends to be numerous and frequent, this indicates that orangutan activity tends to be large, so the smaller the nest class, the more orangutan activity increases [20].

Table 1 Class and Position of orangutan nests in Jantho Pine Forest Nature Reserve

Nest Tree		Nest Class	Nest Position
Vernacular Name	Scientific Name		
Dada Kedih	*Mallotus tetracocus*	2	2
Gala-gala	*Ficus hispida*	1	3
Jambu Mawar	*Syzygium jambos*	3	2
Beras Konyel	*Ficus sagitata*	1	1
Latong	*Laportea microstigma*	2	2
Meudang	*Aporosa* sp.	2	2
Bayur	*Pterosternum javanicum*	2	2
Pepoa	*Mallotus philipensis*	1	3
Rambung	*Ficus* sp.	1	2
Stur Padi	*Aglaia elliptica*	1	2
Tampu	*Semiglobic macaranga*	1	2

The correlation between class and nest trees shows an interest in orangutans on certain nest trees. Pepoa (*Mallotus philipensi*) was founded around the class 1 adaptation cages. Orangutans' interest in human activities is evidenced by the existence of a new nest. Meanwhile, class 2 nests had founded on several trees bearing fruit, one is bayur (*Pterosternum javanicum*). Many orangutan nests were found in the tree. Meanwhile, class 3 nests were found in the jambu mawar tree (*Syzygium jambos*). The previous research [21] shows that the Myrtaceae family was used rarely as a nest due to less sturdy stems.

The orangutan nest position found inside the research area is 1, 2, and 3. While positions 4 and 5 were not founded. Meanwhile, the second position nest is the most commonly encountered tip. The second position nest is the most found at the Jantho Reintroduction Station [22]. The second position is the safest type because it is in the middle of a tree and can withstand the weight of 2 mothers and orangutan's child [23]. Subsequently, the second position nest encountered is an indication of the presence of orangutans in the group of mothers, children, and adolescents. It is because they like to nest in position 2 [24].

The selection of the nest position is strongly influenced by the structure of a nest tree. The selection of nest positions is related to the safety and comfort for orangutans [22]. Nest position 3 are found in pepoa (*Mallotus philipensis*) and galagala (*Ficus hispida*) trees, when viewed position 3 is at the top of the tree which can provide wider visibility for orangutans, making it easier to monitor the location of feed [25]. However, the weakness of this position is that it is at the top of a tree where the tree trunk is young and prone to breakage, thus providing an accident opportunity for orangutans.

Position 5 was not found. It indicates that no orangutans like to play on the ground. The introduced orangutan adapts well to the forest area. While position 4 was a fairly complicated position type because it combines branches from two different trees and places a nest between them. Another research on the nesting behavior of Sumatran orangutans at the Jantho reintroduction station found few nests at position 4 [23].

3.2 Orangutan Nest Variations

The process of creating a nest begins with the selection of nest trees. Then the tightening/bending of the trunk branches as a foundation, and then the arrangement of twigs and leaves for the mattress layer as well as head supports and locking by making knots from twigs [26]. Usually, there are differences in nest shape and position due to differences in sex, age level, and body weight. However, it is not known yet whether there is a difference in the period of release per individual carried out on the ability to make nests.

The entire nest found in the study in some trees did not show any additional constituent components from other plants around. All constituent components come from the main nest tree. It means both twigs as the foundation, leaves, and others come from the same type. It can be assumed to come from the same nest tree. The nest arrangement consists of tree branches bent and added with several branches or broken leaves that cover them. However, the shape of the nest, the size of the diameter, and the thickness made vary depending on the abilities and needs of the orangutan. In this study, several models of orangutan nest architecture at the Jantho Orangutan Reintroduction Station were obtained, including:

A. Single round shape

This form composition is made of just bent branches with a few piles of leaves (Figure 3). Therefore, the nest becomes comfortable when occupied. The basic foundation is in the form of small branches or branches as much as 5 to 6 layers from the opposite direction then continued with smaller branches to add comfort. Next is the pad/mattress on the nest can consist of several layers of twigs from 6 to 10 layers. Such nests are firmly intertwined and not easily damaged. It is said to be a round shape because the ratio between thickness and diameter is almost close to 1:1.

Figure 3 Single round nest; a. the nest is very sturdy and between the branches of one another is intertwined and b. It is on tampu tree (*Macaranga semiglobosa*).

B. Single flat shape

Its composition is made of just bent branches with a few piles of leaves to comfort when occupied (Figure 4a). Such nests can consist of several layers of twigs and be of a flatter shape. The layers are not too thick. Usually, it only consists of layers or basic foundations of as many as 3 to 4 layers. Then it continued with a layer of branches with as many as 5 to 6 layers as a base. The ratio of thickness to diameter is visible when viewed.

C. Stratified shape

The shape of this nest is made of branches composition that are bent along with a few piles of leaves to make it comfortable when occupied as well as other forms of orangutan nest architecture (Figure 4b). Its shape has two parts. The bottom is served as a bed, and the top is shaded as a protector (such as a roof). It consists of different layer thicknesses between the base and the roof. Usually, the roof has a thinner thickness compared to the base one.

Figure 4 Single flat shape (a) and stratified shape (b) nests.

D. Irregularly dilated shape

This form is usually from the old refurbished former nest, by adding new branches to the nest (Figure 5).

Figure 5 Irregular nest of released Sumatran orangutan

4 Conclusions

The released orangutans in the JOR Station have four nest architectures. It is a single round, flat oval, stratified, and irregularly dilated shape. Furthermore, several classes and positions of orangutan nests were created by introduced orangutans. The classes were dominated by class 1 as a new nest. It was followed by classes 2 and 3 while classes 4 and 5 were not found. This result indicated there are no released orangutans have been creating nests on the forest floor. Overall, released orangutans can build nests to support their leave in the forest.

Acknowledgment

The author would like to thank the Aceh BKSDA for permitting to conduct this research in a conservation area of the Jantho Nature Reserve. Thanks to Rio Ardi, Nur Latifa Auliah, and Muhammad Iqbal Maulana for helping with data collection and identification. This research was supported by the PTM research scheme of the Ministry of Education, Cultural, Research, and Technology.

REFERENCES

[1] Ancrenaz, M., Gumal, M., Marshall, A.J., Meijard. E., Wich, S.A., Husson, S. *Pongo pygmaeus*. *Page The IUCN Red List of Threatened Species Version 20*, IUCN Global Species Programme Red List Unit, 2016.

[2] Singleton, I., Wich, S., Nowak, M., Usher, G., Utami-Atmoko, S. *Pongo abelii*, IUCN Global Species Programme Red List Unit, 2017.

[3] Nater, A., Mattle-Greminger, M. P., Nurcahyo, A., Nowak, M. G., De Manuel, M., Desai, T., & Lameira, A. R. "Morphometric, behavioral, and genomic evidence for a new orangutan species," *Current Biology*, vol. 27, no. 22, pp. 3487-3498. 2017.

[4] Wich, S.A., Singleton, I., Nowak, M.G., Atmoko S.S.U., Nisam, G., Arif S.M., Putra R.H., Ardi R., Fredriksson G.,Usher G., Gaveau D.L.A., Kühl H.L., Land-cover changes predict steep declines for the Sumatran orangutan (*Pongo abelii*). 2016.

[5] Yayasan Ekosistem Lestari, "Program Konservasi Orangutan Sumatera," [Online]. Available: http://www.yelweb.org/program-konservasi-orangutan-sumatera [Accessed: 14 November 2015].

[6] Mistar, Gesti, Irvan, Herman dan Syamsul, Survei Populasi Ungko Lengan Putih *Hylobates lar*, Siamang *Symphalangus syndactylus*, dan Mamalia Lain di Cagar Alam Pinus Jantho, Provinsi Aceh, Yayasan Ekosistem Lestari, Medan, 2013.

[7] Prayogo H., Thohari A.M., Sholihin D.D., Prasetyo L.B., dan Sugardjito, "Karakter kunci pembeda antara Orangutan Kalimantan (*Pongo pygmaeus*) dengan Orangutan Sumatera (*Pongo abelii*)," *Bionatura*, vol. 16, no. 1, pp. 61-68. 2014.

[8] Meijaard, E., Rijksen, H.D., & Kartikasari, S.N. *Di Ambang Kepunahan! Kondisi Orangutan Liar Diawal Abad Ke-21*, The Gibbon Foundation Indonesia, Jakarta, 2001.

[9] Onrizal, O., & Bahar, M. "Preferences of Sumatran orangutan nesting tree at Bukit Lawang Forests of Gunung Leuser National Park," *IOP Conference Series: Earth and Environmental Science*, vol. 260, no. 1, p. 012082. 2019.

[10] Prasetyo, D., Ancrenaz, M., Morrogh-Bernard, H. C., Utami Atmoko, S. S., Wich, S. A., & van Schaik, C. P. "Nest building in orangutans," *Orangutans: Geographic variation in Behavioral Ecology And Conservation*, pp. 269-277. 2009.

[11] Abernethy, J. "The Influence of Forest Structure on Sumatran Orangutan Nesting and Densities in the Lowland Dipterocarp Forests of North Sumatra," Pd.D. dissertation, Liverpool John Moores University, 2019.

[12] Fruth, B., Tagg, N., & Stewart, F. "Sleep and nesting behavior in primates: A review," *American journal of physical anthropology*, vol. 166, no. 3, pp. 499-509. 2018.
[13] Samson, D.R. and K.D. Hunt. "Chimpanzees Preferentially Select Sleeping Platform Construction Tree Species with Biomechanical Properties that Yield Stable, Firm, but Compliant Nests," *Plos One*, vol. 9, no. 4, p. e104024. 2012.
[14] Cheyne, S. M., Rowland, D., Höing, A., & Husson, S. J. "How Orang-Utans Choose Where To Sleep: Comparison Of Nest Site Variables," *Asian Primates Journal*, vol. 3, no. 1, pp. 13-17. 2013.
[15] Nasution A, Farajallah DP, Atmoko SSU. "Nesting characteristics of the Tapanuli orangutan (*Pongo tapanuliensis*) in two unprotected forests of Batang Toru, North Sumatra," *Trop Life Sci Res*, vol. 29, no. 2, pp. 77-87. 2018.
[16] Ancrenaz, M., Calaque, R., & Lackman-Ancrenaz, I. "Orangutan nesting behavior in disturbed forest of Sabah, Malaysia: implications for nest census," *International Journal of Primatology*, vol. 25, no. 5, pp. 983-1000. 2004.
[17] Nasution, A., Perwitasari-Farajallah, D., & Utami-Atmoko, S. S. "Nesting characteristics of the tapanuli orangutan (*Pongo tapanuliensis*) in two unprotected forests of batang toru, North Sumatra," In *IOP Conference Series: Earth And Environmental Science*, vol. 197, no. 1, p. 012027. 2018.
[18] Van Schaik, C. P., Priatna, A., & Priatna, D. "Population estimates and habitat preferences of orangutans based on line transects of nests," In *The neglected ape*, Springer, Boston, pp. 129-147, 1995.
[19] Atmoko, U. S. S., & Arif Rifqi, M. *Buku Panduan Survei Sarang Orangutan*, Forum Orangutan Indonesia, Jakarta, 2012.
[20] Niningsih, L., Boer, C., & Pambudhi, F. "Deskripsi Beberapa Karakteristik Sarang Orang Utan Di Prevab Taman Nasional Kutai dan di Hutan Konservasi PT Sumalindo Hutani Jaya II Site Bhirawa, Kalimantan Timur," *Jurnal Kehutanan Tropika Humida*, vol. 2, no. 1, pp. 55-68. 2009.
[21] Rifai, M., Patana, P., & Yunasfi, Y. "Analisis Karakteristik Pohon dan Sarang Orangutan Sumatera (*Pongo abelii*) di Bukit Lawang Kabupaten Langkat (analysis of the trees and nest characteristics of sumatran orangutan (*Pongo abelii*) in Bukit Lawang, Langkat District)," *Peronema Forestry Science Journal*, vol. 2, no. 2, pp. 130-136. 2013.
[22] Sutekad, D., Iqbar, I., Masykur, M., & Fonna, I. "Perilaku bersarang orangutan Sumatera (*Pongo abelii*) di Stasiun Reintroduksi Orangutan Jantho, Aceh Besar," *Jurnal Bioleuser*, vol. 3, no. 3, pp. 59-64. 2019.
[23] Yakin, M.R. "Perilaku bersarang orangutan Kalimantan (*Pongo pygmaeus wurmbii*, tiedemann 1808) di tipe habitat yang berbeda di Stasiun Penelitian Cabang Panti, Taman Nasional Gunung Palung, Kalimantan Barat," Skripsi, Universitas Islam Negeri Syarif Hidayatullah, Jakarta, 2013.
[24] Khoetiem, M., Lovadi, I., & Tjiu, A. "Studi awal karakteristik pohon sarang dan sarang orangutan (*Pongo pygmaeus pygmaeus*: Linnaeus 1760)," *Jurnal Protobiont*, vol. 3, no. 2, pp. 193-200. 2014.
[25] Pujiyani, H. "Karakteristik pohon tempat bersarang orangutan Sumatera *(Pongo abelii)* di kawasan hutan batang toru kabupaten tapanuli utara sumatera utara," Skripsi, Fakultas Kehutanan, Institut Pertanian Bogor, Bogor, 2008.
[26] Prasetyo, D. "Inteligensi Orangutan Berdasarkan Teknik dan Budaya Perilaku Membuat Sarang," Tesis, Universitas Indonesia, Jakarta, 2006.