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Description and Preferences of Tarsier (*Tarsius supriatnai*) Nest Trees In Nantu Wildlife Reserve, Gorontalo

Deskripsi dan Preferensi Pohon Sarang Tarsius (*Tarsius supriatnai*) di Suaka Margasatwa Nantu Gorontalo

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determinant factors, nest biophysics, primate, *Tarsius supriatnai*

ABSTRACT

Tarsiers *(Tarsius supriatnai)* were part of the endemic primates in Sulawesi categorized as vulnerable in the IUCN red list. Therefore, this research aimed to describe and analyze the characteristics, preferences, and determinant factors influencing the use of nest trees by tarsiers in Nantu Wildlife Reserve, Gorontalo. This research used a direct observation method to collect data for three months, from September to November 2013, focusing on temperature, humidity, light intensity, tree height, tree diameter, nest height from the ground, and frequency of nest use. Moreover, the Neu index was applied to determine nest preferences and multiple linear regression analysis was used to analyze the factors influencing nest tree selection. The results showed that the primates preferred eight nest trees, including *Ficus altissima* (w=1.58) and *Ficus benjamina* (w=1.50). Multiple linear regression analysis showed that the humidity (4.103±3.674%, P>0.05) and light intensity (126.362±41.149 lx, P<0.05) became dominant factors influencing the frequency of nest use. The results generally showed that vegetation species and microclimate conditions were crucial for tarsiers, indicating the importance of preserving forest areas to ensure the conservation of these primates.

KATA KUNCI
faktor determinan, biofisik sarang, primata, Tarsius supriatnai

INTISARI

Tarsius supriatnai merupakan salah satu primata endemik Sulawesi yang termasuk dalam daftar merah IUCN dengan kategori rentan. Penelitian ini bertujuan untuk mendeskripsikan dan menganalisis karakteristik, preferensi dan faktor determinan yang memengaruhi pemanfaatan pohon sarang Tarsius supriatnai di Suaka Margasatwa Nantu Gorontalo. Penelitian ini dilakukan selama tiga bulan (September–November 2013). Pengambilan data menggunakan metode observasi langsung. Data yang dikumpulkan meliputi suhu sarang, kelembaban sarang, dan intensitas cahaya dalam sarang, tinggi pohon sarang, diameter pohon sarang, tinggi sarang dari atas tanah, dan frekuensi penggunaan sarang. Untuk mengetahui preferensi sarang digunakan indeks Neu dan untuk menganalisis faktor determinan pemilihan pohon sarang digunakan model regresi linear berganda. Hasil penelitian memperoleh delapan pohon sarang, yang terdiri dari jenis Ficus. Berdasarkan analisis regresi linear berganda, faktor dominan yang berpengaruh terhadap frekuensi penggunaan pohon sarang adalah kelembaban (4,103±3,674%, P>0,05) dan intensitas cahaya (126,362±41,149 lx, P<0,05). Berdasarkan indeks Neu diketahui bahwa tarsius di SM Nantu menyukai Ficus altissima (w=1,58) dan Ficus benjamina (w=1,50) sebagai pohon sarang. Secara umum, penelitian ini menunjukkan bahwa jenis vegetasi dan kondisi iklim mikro sangat penting bagi tarsius, yang berarti bahwa pelestarian kawasan hutan menjadi syarat penting bagi upaya konservasi tarsisus.

Introduction

Tarsiers (*Tarsius supriatnai*) are taxonomically separated from *the Tarsius tarsier*/*Tarsius spectrum* in 2017 (Shekelle et al. 2017). These endemic primate species are distributed across the northern peninsula of Sulawesi, from the western tip of Gorontalo to Sejoli and Ogatemuku areas in Central Sulawesi (Shekelle 2020). Meanwhile, tarsiers were recently categorized in the IUCN Red List as a vulnerable group due to the decline in the population caused by the threats of habitat loss and increased hunting pressure (Shekelle 2020).

Nantu Wildlife Reserve is an example of a wildlife conservation area developed particularly for tarsiers in Gorontalo Province (Dunggio 2005; Faz et al. 2020) based on Decree No.3029/MenhutII/KUH/ 2014 of the Minister of Forestry. It covers an area of 51,639.17 ha and administratively spans three regencies, including Gorontalo, Boalemo, and North Gorontalo (Azdin et al. 2021). Moreover, the different habitat types in the reserve support the high biodiversity of flora and fauna (Dunggio 2005). This diversity shows the need to preserve tarsiers, part of the biodiversity, through targeted conservation efforts. The factors considered necessary in the process include providing supporting data through research on ecology and habitat biophysics (Wirdateti & Dahrudin 2006). Most current research on tarsiers focused on the population (Mustari et al. 2013; Polii et al. 2015; Rizki & Abiduna 2020), behavior(Gursky 2000; Manori et al. 2014), diet, and nest habitat (Wirdateti & Dahrudin 2006; Krisnatalia et al. 2013; Loing et al. 2017; Krisnatalya et al. 2020; Sapsuha et al. 2021). Research on the description of nest trees still needs more attention. For example, Alferi et al. (2017) focused on the characteristics of *the Tarsius wallacei* nest without discussing the light intensity despite the significant importance of the factor on the behavior of nocturnal animals(Gursky 2000).

Research on tarsiers (*Tarsius supriatnai*) needed to be more extensive. Shekelle (2020) further stated that no research focused on tarsiers in their natural habitat. However, two recent publications discussed habitat preferences (Zakaria et al. 2022) and population density of the tarsiers (*Tarsius supriatnai*) in Popayato-Paguat (Bienkowski et al. 2018). Neither publication specifically described the nest preferred by tarsiers despite the importance of the factor in understanding animal behavior (Hernandez-Aguilar & Reitan 2020). The nest trees became the most critical habitat components for tarsiers, allowing them to rest, sleep, play, reproduce, and enhance their dispersal patterns (Gursky 2010). The background information shows the need to understand the characteristics of nest trees supporting the survival of tarsiers. This research aimed to fill the gap by describing and analyzing the characteristics, preferences, and determinant factors influencing the use of nest trees by tarsiers in Nantu Wildlife Reserve. The intention was to present initial data on the biophysical conditions of nest trees in the reserve to be used in implementing conservation efforts for the species and the area.

Methods

Time and Location

Nantu Wildlife Reserve, Gorontalo Province, situated between 200-2065 meters above sea level (masl), became the research area. The reserve covered an area of 51,639.17 ha and administratively fell under the Gorontalo, Boalemo, and North Gorontalo regencies (Rahim, 2015; Azdin et al. 2021). The area was a primary forest with dense canopy cover (Dunggio 2005; Hamidun et al. 2017). The sample location was in the western part of the Nantu Wildlife Reserve and administratively in Boalemo Regency, with coordinates 0°47'14.63" North Latitude and 122°16'39.05" East Longitude (Figure 1). The data collection process was conducted for three months, from September to November 2013, and was preceded by pre-research consisting of field familiarization, nest identification, and trail establishment.

Data Collection

Data was collected by directly observing the purposively selected habitat area at Nantu Wildlife Reserve. The sample selection was based on the tarsiers encountered during the pre-research phase. Tarsiers (*Tarsius supriatnai*) identification was achieved by following the duet calls emitted by tarsiers during the early morning (Saroyo et al. 2014; Polii et al. 2015) and recording the location of the trees. This

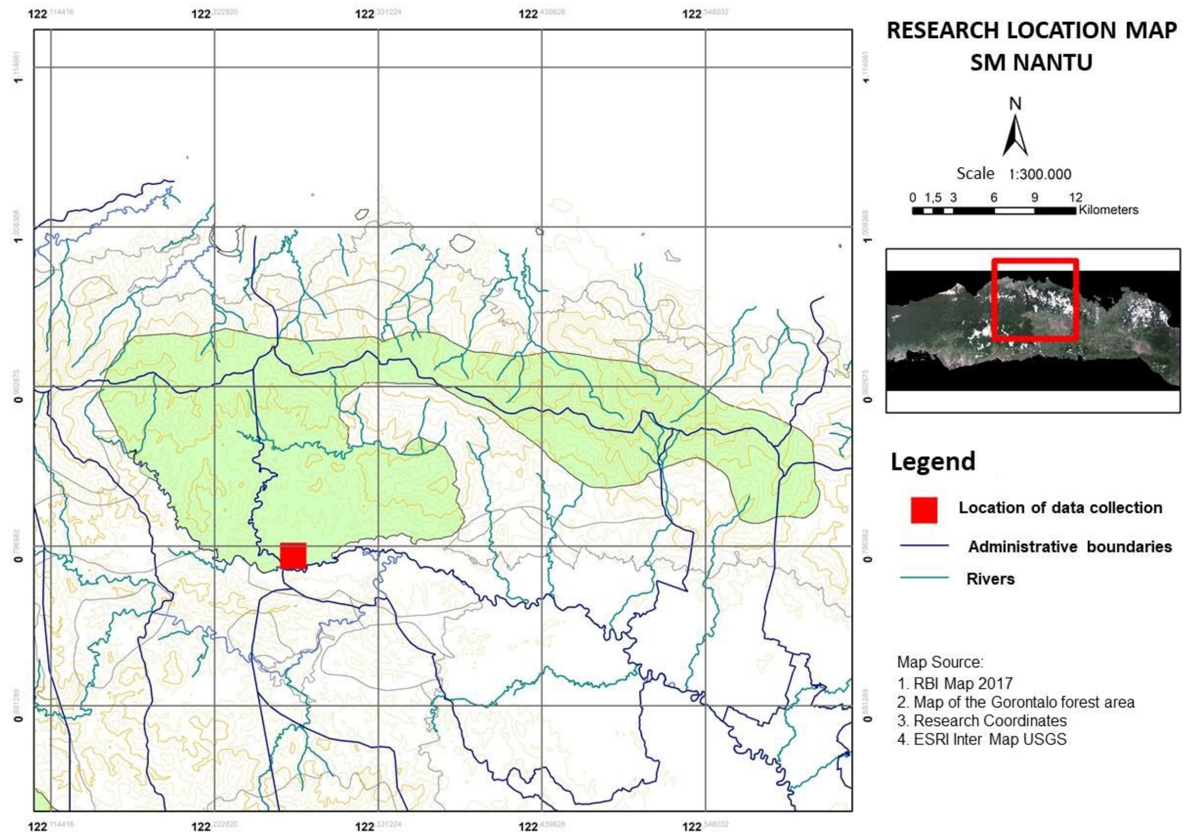

Figure 1. Research area in Nantu Wildlife Reserve

research applied exploration to locate and identify nest trees of tarsiers in a sampling quadrant of 1 km^2 or 100 ha. Subsequently, the observation and data collection stage focused on the biophysical characteristics of nest trees. The following were the procedures of this research.

1. Temperature and humidity were measured using a thermo-hygrometer placed inside the nest three times a day: in the morning (07:00 am-08:00 am), in the afternoon (12:00 pm-01:00 pm), and in the evening (05:00 pm-06:00 pm).
2. Light intensity was measured using a lux meter placed inside the nest three times a day: in the morning (07:00 am-08:00 am), afternoon (12:00 pm-01:00 pm), and evening (05:00 pm-06:00 pm).
3. The local and scientific names of the nest tree species were recorded.
4. The tree diameter at breast height (dbh), 1.30 m from the ground surface or 20 cm above the tree buttress, was measured using a phi-band measuring tape.
5. The total tree height was measured using a haga-hypsometer.
6. The nest height from the ground was measured using a 30 m measuring tape or roll meter.
7. The frequency of nest use was evaluated by recording the presence of tarsiers on nest trees every morning from 05:00 am to 06:30 am. The presence of tarsiers was determined through duet calls made by tarsiers and direct contact with each individual when entering nest trees. The observation process lasted 20 consecutive days.

Data Analysis

Nests data were analyzed descriptively and presented in tables and figures. The nest tree preference analysis employed the Neu method (Neu et al. 1974), commonly used to determine the animal preference index (Neu et al. 1974; Meylia et al. 2023). The calculation of the nest tree preference index used Equation 1.

$$w = \frac{\mu}{p} \quad (1)$$

with remarks: w = nest preference index; u = the proportion of nests used by tarsiers; p = the proportion of nest trees. Furthermore, the calculation of the proportion of nests used by tarsiers (u) used Equation 2:

$$u = \frac{n_i}{\sum n_i} \quad (2)$$

with remarks: ni=the frequency of nest use by tarsiers; Σni=the total number of nests used. Meanwhile, the calculation of the proportion of nest trees (p) used Equation 3:

$$p = \frac{a_i}{\sum a_i} \quad (3)$$

with remarks: ai=the number of nest trees used by tarsiers; Σai=the total number of available nest trees. Lastly, the calculation of the standardized preference index (b) used Equation 4:

$$b = \frac{w_i}{\sum w_i} \quad (4)$$

with remarks: wi=the nest preference index; Σai=the total number of nest preference index.

The w value greater than one (w >1) indicated that tarsiers preferred the nest tree (Neu et al. 1974). Furthermore, the sequence of preference levels was based on w values, with the primary nest tree represented by the highest w value, followed by the others (Bibby et al. 1998). A chi-square (χ2) test was performed to investigate the relationship between the tarsiers and specific nest trees. The nest tree should be selected when calculated $\chi2 > \chi2_{table}$ (0.05, k-1) but not be selected when calculated $\chi2 \leq \chi2_{table}$ (0.05, k-1)(Johnson and Bhattacharyya 2019).

The variation of biophysical factors of each nest was analyzed using one-way ANOVA for homogenous and normally distributed data. In contrast, Welch ANOVA was used for heterogeneous and normally distributed data (Delacre et al. 2020). This research used Pearson correlation to analyze the relationship between nest biophysical factors and tarsier nest use. The factors influencing nest selection were also analyzed using multiple linear regression analysis through IBM SPSS Statistics for Windows, version 20.0 (IBM Corp., Armonk, NY, USA). In this analysis, the frequency of nest use became the dependent variable (Y), while the nest's physical components became the independent variable (X). Equation 5 was the general model for multiple linear regression:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \ldots + \beta_5 X_5 \quad (5)$$

with remarks: Y=frequency of nest use; βo=intercept value; $\beta i = i_{-th}$ regression coefficient value; X_1=temperature (°C), X_2=humidity (%), X_3=light intensity (lx), X_4=tree diameter (m); X_5=nest height from the ground (m).

Results and Discussion

Nest Description

The total number of nest trees identified for tarsiers along the research trail was eight (Figure 2). All the nest trees belonged to the genus Ficus (beringin), consisting of *Ficus virens, Ficus altissima, Ficus benjamina, Ficus caulocarpa*, and *Ficus* sp (Table 1). The height of the nest trees ranged from 22.4-40.27 m, while the nest height from the ground was from 2.45-10.67 m, and the tree canopy's diameter was from 1.26-3.74 m. All the nest trees' altitudes ranged from 82-124 masl. These results were similar to the observation of Mansyur et al. (2016) that *Tarsius* sp at Buton Island distributed at an altitude of 53-293 masl and occupied *Ficus* trees with a height of 10-30 m. The trend was also in line with the results reported by Wirdateti and Dahrudin (2006) that *the Tarsius spectrum* in Tangkoko Nature Reserve was from lowland to an altitude of 1,300 masl and used trees up to 30 m high with diameters of 1.5-2.5 m. In general, *Tarsius supriatnai* can adapt to habitat conditions, including converted forests. However, in degraded habitats, the species was only found in areas with dense vegetation structures such as bamboo clumps or rattan stands (Bienkowski et al. 2018), indicating that tarsiers required specific habitats to live and survive.

All observed nests were formed from Ficus roots wrapped around the parent tree to create interconnected small holes (Figure 3). The nest description in this research was similar toGursky (2000) observation that tarsiers in Tangkoko Nature Reserve most often used beringin trees due to the shelter they provided from predator attacks. Seven of the eight nest trees had central holes and several interwoven roots, which allowed easy grasping and leaping from one place to another. The preference for these trees was also associated with the existence of smaller holes that served as entry and exit points for tarsiers (Mac-

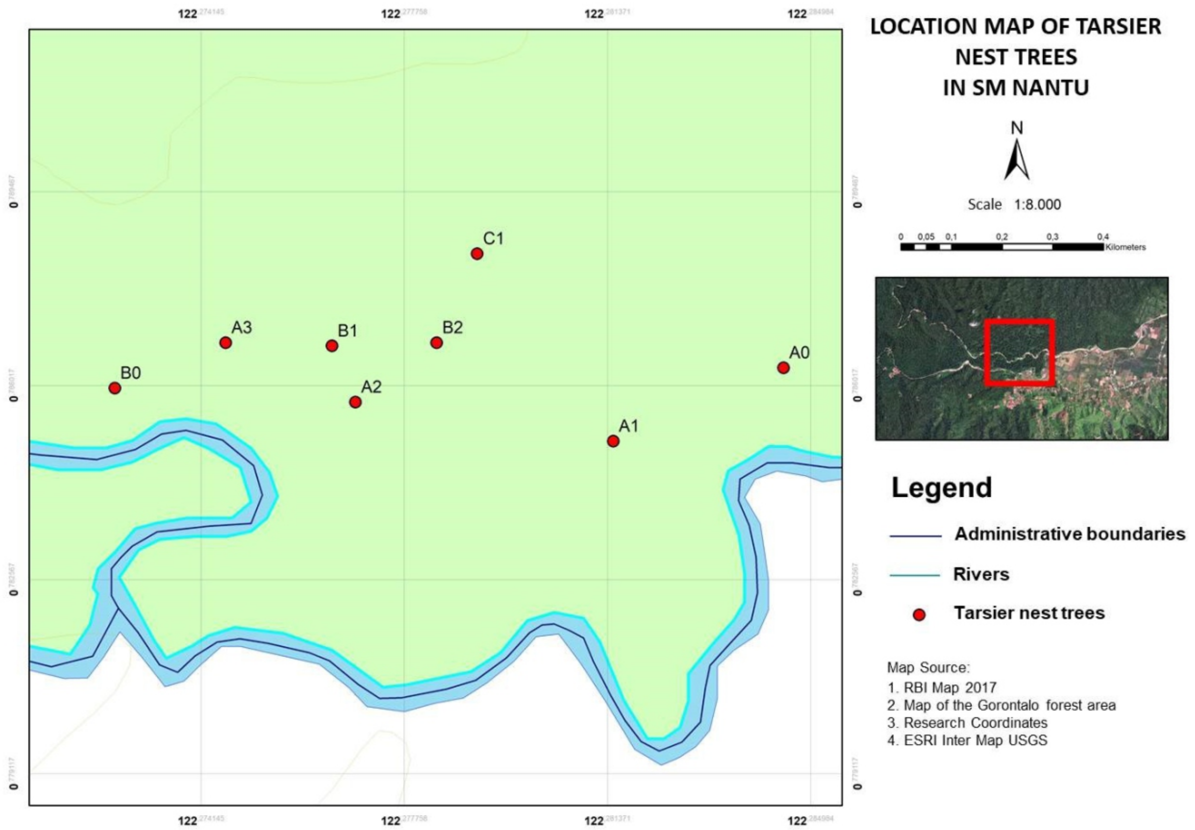

Figure 2. Distribution of tarsier nest trees in the research area

Table 1. Tarsier nest tree species

No.	Nest	Species	Tree Diameter (m)	Tree Height (m)	Nest Height from the Ground (m)	Altitude (masl)
1	A1	*Ficus virens*	1.68	35.8	8.62	88
2	A2	*Ficus altissima*	3.74	27.82	10.76	95
3	A3	*Ficus altissima*	3.34	40.27	7.44	95
4	B1	*Ficus benjamina*	2.42	31.62	8.38	95
5	C1	*Ficus* sp	2.11	24.81	6.64	93
6	A0	*Ficus caulocarpa*	1.42	24.62	2.45	82
7	B0	*Ficus* sp	2.81	22.4	5.17	104
8	B2	*Ficus virens*	1.26	28.74	6.27	90
		Mean (SD)	2.35(0.90)	29.51(6.09)	7.51(2.68)	92.75(6.41)

Kinnon and MacKinnon 1980). However, one tree had no hole but had interwoven roots that provided cavities for tarsiers to sleep and rest. This situation was similar to that of tarsiers in Tangkoko Nature Reserve, which used interwoven *Ficus* roots for different activities (Wirdateti and Dahrudin 2006). In several other places, tarsiers frequently use hollow Ficus trees, dense bushes, and fallen trees as nests (Krisnatalia et al. 2013; Krisnatalya et al. 2020; Loing et al. 2017; Mansyur et al. 2016).

The selection of closed, hollow, and interwoven roots was related to the bioecology of tarsiers as nocturnal species (Gursky 2000) that usually avoid light during the day. The availability of these roots and branches facilitated the movement of tarsiers by leaping from one branch to another, a behavior known as vertical clinging and leaping (Crompton et al. 2010). It also allowed tarsiers to "park" their infants to ensure proper grasping (Gursky 2002).

Nest Biophysics

The daily temperature range for each nest tree was from 23.6-28.1°C for A1, 23.3-29.4°C for A2, 23.5-27.3°C for A3, 23.7-27.0°C for B1, 23.1-27.2°C for C1, 24.8-

(a) (b) (c)

Figure 3. Tarsier nest trees: (a) A2 (*Ficus altissima*); (b) A1 (*Ficus virens*); and (c) B1 (*Ficus* sp).

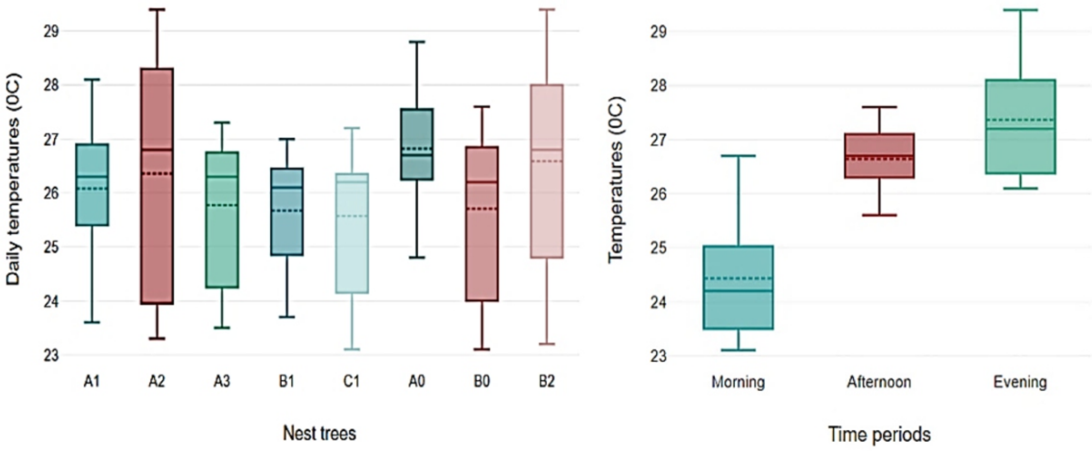

Figure 4. Boxplots of daily temperature in nest trees and by time

28.8°C for A0, 23.1-27.6°C for B0, and 23.2-29.4°C for B2. Furthermore, the temperature range inside the nest was determined by time and found to be from 23.1-26.7°C in the morning, 23.9-27.6°C in the afternoon, and 24.2-29.4°C in the evening (Figure 4). The Welch ANOVA test showed no differences in daily temperature for each tree species at Sig 0.095>0.05. Temperature is crucial in wildlife's life because it serves as a factor determining reproductive productivity (McNutt et al. 2019) and influences metabolism (Sepulveda & Moeller 2020). Moreover, temperature significantly influences the spatial distribution patterns of wildlife (Rosyid et al. 2019).

The nest temperatures recorded in this research were relatively similar to Alferi et al. (2017) for *Tarsius wallacei* in Lebanu, Central Sulawesi, ranging from 23.12-24.12°C in the morning and 24.96-25.16°C at night. However, the nest temperatures in this research were slightly higher than those of (Loing et al. 2017) for tarsier nests in Tangkoko Nature Reserve, ranging from 20.85-21.9°C in the morning, 23.7-24.25°C in the afternoon, and 23.85-24°C in the evening. Vegetation density around nest trees, the hole width of trees, and weather conditions during the data collection period influenced the temperature variation (Kearney and Porter 2016; Thiruvenggadam et al. 2022; Velander et al. 2023). The relatively high nest temperatures in this research were associated with the air temperature in Gorontalo, which ranged from 24-30°C (Dunggio 2005). The maximum air temperature in Gorontalo was 35.10°C in October 2021 and 34.40°C in November 2021 (Badan Pusat Statistik Gorontalo 2021).

Humidity also influences the lives of wildlife. The nest tree humidity was from 90.8-94.2% for A1, 90.8-94.3% for A2, 90.7-94.3% for A3, 91.6-94.2% for B1, 89.3–94.1% for C1, 93.7–94.8% for A0, 87.6-94.8% for B0, and 90.1-93.8% for B2. Moreover, the nest humidity was 92.2-94.8% for the morning, 90.2-93.7% for the afternoon, and 87.6-92.8% for the evening (Figure 5). The ANOVA test revealed no difference in daily humidity for each tree species at Sig 0.064>0.05. The average nest humidity in this research was higher than those reported by Alferi et al. (2017) for *the Tarsius wallacei* nest at Lebanu, Central Sulawesi, ranging from 86-90.2% in the morning and 80.8-81% at night. The nest humidity values were also higher than the nest humidity of Tarsiers in Tangkoko Nature Reserve, which was 81.2-81.6% in the morning, 77.9-78.6% in the afternoon, and 77.3-77.5% in the evening (Loing et al. 2017). The humidity variation was caused by weather, vegetation cover, and light intensity (Kearney and Porter 2016; Puteri et al. 2022; Thiru-venggadam et al. 2022). Nantu Wildlife Reserve had a relatively high air temperature, but the dense vegetation cover hindered sunlight from penetrating the forest floor, leading to high air humidity (Hamidun et al. 2017).

Light intensity determined the tarsier's activities. Tarsiers were nocturnal and required low light intensity to be active and for rest. The light intensity of each nest tree in this research was 0.10-1.46 lx for A1, 0.08-1.50 lx for A2, 0.06-1.33 lx for A3, 0.06-1.30 lx for B1, 0.03-1.33 lx for C1, 0.12-1.59 lx for A0, 0.12-1.42 lx for B0, and 0.11-1.62 lx for B2. Moreover, the light intensity inside was 0.06-0.25 lx in the morning, 0.96-1.62 lx in the afternoon, and 0.06-0.29 lx in the evening (Figure 6). The one-way ANOVA test showed no differences in light intensity for each tree species (Sig 0.997>0.05). Previous research reported the light intensity surrounding the tarsier nest. For example, Andriyani et al. (2021) discovered a range of 299.16-1917.04 lx around *the Tarsius fuscus* nest in the secondary forests

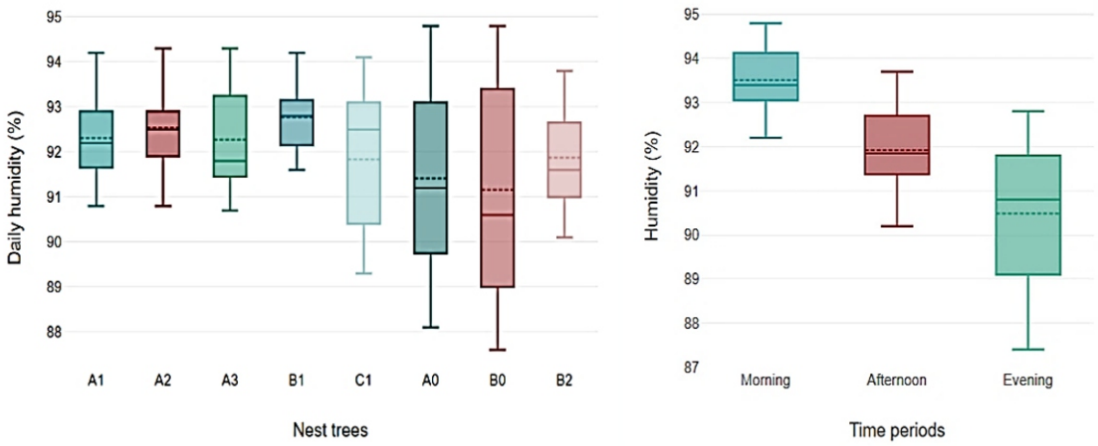

Figure 5. Boxplots of daily humidity in nest trees and by time

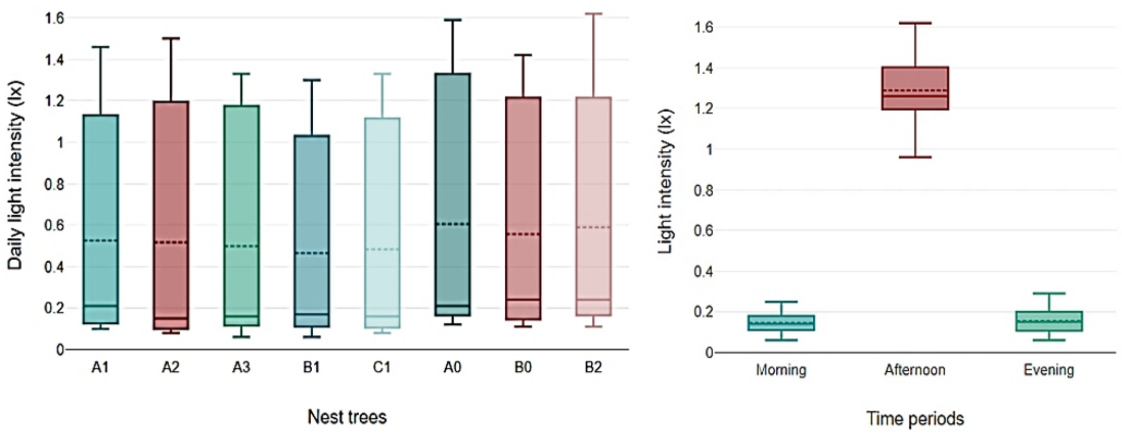

Figure 6. Boxplots of daily light intensity in nest trees and based on time periods

of South Sulawesi. Krisnatalya et al. (2020) also reported a 200-3500 lx range around *Tarsius dentatus* nest in Morowali Nature Reserve. Furthermore, Krisnatalia et al. (2013) found the range around *the Tarsius dentatus* nest in Lore Lindu National Park to be 2,000-83,000 lx, but Sapsuha et al. (2021) reported 311.87-391.29 lx for the *Tarsius spectrumgurskyae* nest in Mount Tumpa Grand Forest Park. This research became the first to report the light intensity inside the tarsier nest.

Biophysical Factors Influencing Nest Use

The frequency of nest use became the basis for determining the preference level for nest selection in this research. During 20-day observations, not all nest trees were used consecutively by tarsiers daily (Table 2). The regression analysis assumed that biophysical factors influenced the frequency of nest use. The frequency of nest use became the basis for determining the preference level for nest selection in this research. During 20-day observations, not all nest trees were used consecutively by tarsiers daily (Table 2). The multiple linear regression revealed that humidity (X_2) and light intensity (X_3) significantly influenced the frequency of tarsier presence in nest trees. The multiple regression model resulting from the analysis was $Y=-297.566+4.103X_2-126.362X_3$. The light intensity inside the nest became the most dominant variable, with a beta value of -126.362.

The partial t-test indicated that humidity had a positive but no significant effect on the frequency of nest use (Sig. 0.351>0.05). In contrast, light intensity had a negative and significant effect (Sig. 0.028<0.05). However, the F-test showed that humidity and light intensity simultaneously had a significant effect (Sig 0.017<0.05). The coefficient of determination (R^2) was 0.806, indicating that humidity and light intensity simultaneously could explain 80.6% of the variation in the nest use. At the same time, other variables not in the regression model were responsible for the remaining percentage. The Pearson correlation test indicated that light intensity inside the nest had a very strong negative relationship with the frequency of nest use (Sig. 0.005; r= -0.871), while humidity had an insignificant positive relationship (Sig. 0.073; r= 0.664). The results explained that tarsiers preferred a high humidity and low light intensity nest. Higher nest humidity led to more frequent nest use. Meanwhile, higher light intensity inside the nest led to lower frequent nest use.

The results explained that tarsiers preferred a high humidity and low light intensity nest. Higher nest humidity led to more frequent nest use. Meanwhile, higher light intensity inside the nest led to lower frequent nest use. Previous research also suggested that tarsiers selected cool and humid places as nesting areas (Loing et al. 2017), with low light intensity (MacKinnon and MacKinnon 1980). *Tarsius lariang* preferred habitats with a humidity of 80% (Rosyid et al. 2019). The preference was related to the nocturnal nature of these animals (Gursky 2000; Shekelle 2020), which required dark places to sleep. It was also associated with the circadian rhythm, where the activities of nocturnal species, including sleep, were heavily influenced by light(Sanchez et al. 2022).

Nest Tree Preferences

The preference analysis assumed that nests frequently used by tarsiers had a higher preference level. *Ficus altissima* (w=1.58) had the highest preference (Table 3). The chi-square test confirmed that the calculated $\chi 2$ 28.727 was higher than the $\chi 2_{table}$ (0.05, k-1), indicating that tarsier preferred some specific nest trees. Tarsiers generally preferred *Ficus*

Table 2. Frequency of nest use and number of individual tarsiers

No.	Nest	Species	Observation Period (Days)	Frequency of Nest Use (Days)	Number of Individuals
1	A1	*Ficus virens*	20	17	2
2	A2	*Ficus altissima*	20	20	6
3	A3	*Ficus altissima*	20	20	5
4	B1	*Ficus benjamina*	20	19	4
5	C1	*Ficus* sp	20	20	4
6	A0	*Ficus caulocarpa*	20	3	3
7	B0	*Ficus* sp	20	1	4
8	B2	*Ficus virens*	20	1	4
		Total	160	101	32

trees as nests (Andriyani et al. 2021; Gursky 2002), and this was further confirmed through the research in Button Island by Mansyur et al. (2016), where 21 of 32 sleeping areas found for the primates were *Ficus* species. Gursky (2002) reported similar results that 90% of the sleeping trees used by the *Tarsius spectrum* in Tangkoko Nature Reserve were large beringin trees. There were four categories of tarsier sleeping areas which included dense thickets such as bamboo clumps or *pandanus*, dense interwoven climbing plants or epiphytic ferns, crevices or holes in trees with more than one exit, and complex interwoven roots of beringin trees (*Ficus*). The selection of such specific sleeping areas indicated that tarsiers had a preference for trees with certain characteristics, such as low light intensity, availability of surfaces to grip while sleeping, shelter from rain and wind, and multiple entrances or exits to avoid predators (MacKinnon and MacKinnon 1980). This also showed that although tarsiers were often found in secondary and disturbed forests (Krisnatalya et al. 2020; Andriyani et al. 2021; Sapsuha et al. 2021; Zakaria et al. 2022), this species preferred forests with dense vegetation cover (Bienkowski et al. 2018; Rizki and Abiduna 2020; Shekelle 2020).

The information on nest characteristics, preferences, and factors influencing nest tree selection provided a better understanding of the species-habitat relationships. This information helped formulate tarsier conservation strategies and manage conservation areas as tarsier habitats. This research has a limited scope as a preliminary effort, thereby showing the need for further analysis, mainly by adding more variables such as surrounding vegetation, predator presence, food availability, nest hole width/size, and others to obtain more comprehensive knowledge about the description of tarsier nests and the determinant factors influencing nest selection. Moreover, exploratory research was also needed on other nest tree species apart from those found in Nantu Wildlife Reserve.

Conclusion

In conclusion, tarsiers (*Tarsius supriatnai*) in Nantu Wildlife Reserve, Gorontalo, used beringin trees with holes and interwoven roots as nest trees. The preferred nest tree species were *Ficus altissima* and *Ficus benjamina*. The results showed no significant differences in temperature, humidity, and light intensity among nest trees, but the frequency of nest use had some variations. The multiple linear regression analysis also showed that light intensity and humidity became the most dominant factors influencing the frequency of nest use. Furthermore, tarsiers tended to select nest trees with low light intensity and high humidity. The results showed that tarsiers required habitats with high vegetation cover and density to provide preferred nests and micro-climates. The information produced from this research served as a recommendation for the managers of conservation forest areas, specifically Nantu Wildlife Reserve, to preserve and conserve the high vegetation cover as part of the critical tarsier habitats in Sulawesi. The scope of this research was limited to nest trees with characteristics and biophysics variables. Further research on habitat preferences by incorporating several variables, such as the structure and composition of vegetation around the nest, canopy cover percentage, food availability, and distance from human trails, are necessary due to limited research on the *Tarsius supriatnai*.

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Table 3. Tarsier nest tree preferences based on Neu index

Nest Tree Species	a	p	n	u	e	w	b	Ranking
Ficus virens	2	0.25	18	0.18	25.25	0.71	0.15	4
Ficus altissima	2	0.25	40	0.40	25.25	1.58	0.33	1
Ficus benjamina	1	0.13	19	0.19	12.63	1.50	0.31	2
Ficus sp	2	0.25	21	0.21	25.25	0.83	0.17	3
Ficus caulocarpa	1	0.13	3	0.03	12.63	0.24	0.05	5
Total	8	1.00	101	1.00	101	4.87	1.00	

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