International Journal of Health, Economics, and Social Sciences (IJHESS)
Vol. 6, No. 2, April 2024, pp. 550~556
DOI: 10.56338/ijhess.v6i2.5324
Website: https://jurnal.unismuhpalu.ac.id/index.php/IJHESS

Vegetation Analysis of Tarsius Habitat (Tarsius Sp.) in Panua Nature Reserve, Pohuwato Regency, Gorontalo Province

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Article Info

Article history:

Received 16 January, 2024
Revised 5 February, 2024
Accepted 4 April, 2024

Keywords:

Tarsius;
Habitat;
Tarsius Nest;
Panua Nature Reserve;
Bamboo;
Rattan

ABSTRACT

The research aims to analyze the vegetation habitat of Tarsius (Tarsius sp.) in the Panua Nature Reserve, Pohuwato Regency, which will be carried out in April-June 2023. The research location is in the Panua Nature Reserve, Marisa District, Pohuwato Regency, Gorontalo Province. Data collection at tarsier nest locations was divided into 3 stations, namely Station 1 was in a secondary forest location, station 2 was at the border location of secondary forest and plantations, and station 3 was at a plantation location. Collecting plant data by plot and analyzing the importance value for each type of plant. The results obtained were that there were 55 types of plants in the Tarsius (Tarsius sp) habitat in the Panua CA landscape, which were distributed in 3 areas, namely primary forest areas, border areas and plantation areas (secondary forests). Bamboo plants and sugar palm plants were used as Tarsius nests at station 1, Rattan plants and Ficus sp plants were used as Tarsius nests at station 2, while at station 3 the plants used as nests were bamboo plants, Nantu plants and rattan plants.Keywords: Tarsius, Tarsius Nest, Panua Nature Reserve, Bamboo, Rattan

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INTRODUCTION

One of the endemic animals of Sulawesi is the Tarsius (Tarsius sp.). Tarsier is a primitive primate from the family Tarsidae, the only surviving family from the order Tarsiioferms (Qiptiyah et al, 2012). Tarsier is classified as a protected animal because this animal is categorized in the IUCN with vulnerable status and is listed in CITES appendix II as likely to become extinct due to wildlife trade. Until now, the tarsier population tends to decline (Lowing et al, 2013).

The existence of this animal is starting to be a cause for concern because it is threatened with extinction as a result of activities such as habitat reduction and capture for pets. One of the causes of the decline in the population of this animal is the loss of its natural natural habitat, this is a serious threat to the population of this primate (Supriatna and Hendras, 2000). Apart from that, the slow regeneration capacity of Tarsiers (Tarsius sp.), namely two per year, also influences the existence of this species (Wirdateti, 2006).

Gorontalo Province, which is part of the Wallacea region, has an area of 1,221,544 Ha, with a potential forest area of ±826,000 Ha. In this province, Pohuwato Regency is an area that has relatively compact natural forests with a forest area of 87.74% of the total area. Panua Nature Reserve is the third largest conservation area in Gorontalo Province with a total area of 36,575 hectares in accordance with Determination Decree Number SK.3037/Menhut-VII/KUH/2014 with a potential of 162 species of birds, 14 species of mammals, 41 species of hertofauna (BKSDA North Sulawesi , 2022).

CA Panua forest area in Pohuwato Regency has an important function as a habitat for various protected animals and as a regulator of water management, especially most of the watersheds in Marisa

District . In the Panua CA forest area , Tarsiers (Tarsius sp.) have been found with a population of 3-5 groups for every hectare of forest land. The existence of this tarsier is already known to the local community, with its local name being Tukang or Tarsius (Tarsius sp.). Based on the results of observations that have been made, the Taluditi River drainage area can determine the existence of tarsier habitat which nests in several types of plants around the riverbanks, such as bamboo, rattan, snake fruit, palms, and gaps in Matoa trees, because tarsiers have a close relationship with biotic components. and abiotic to support their living needs.

Vegetation is an important biotic factor for Tarsiers as a place to find food, nesting places and shelter from bad weather and hiding from predators. To maintain its existence in nature as a source of biodiversity and remain sustainable and can be used properly, it is necessary to carry out conservation efforts so that its population in nature is not disturbed. So it is necessary to research their habitat preferences.

METHOD

This research was carried out in the Panua Nature Reserve region Marisa District, Pohuwato Regency, Gorontalo Province during April-June 2023 .

The tools used in this research are a Role Meter, used to make plots, GPS (Global Positioning System), used to determine the coordinates of the sampling area, a tape measure, used to measure the circumference of tree trunks, binoculars, used to see the presence of tarsier habitat. , Camera, used for documentation, and Stationery.

This research uses a survey method with a quantitative descriptive approach, the quantitative descriptive method is to research a certain population or sample, data collection uses research instruments, data analysis is quantitative/statistical.

The technique for collecting vegetation data in tarsier habitats uses the Purposive Sampling method based on the presence of plants in locations adjacent to tarsier nests. The research location consists of 3 research stations. Station 1 is at a secondary forest location, station 2 is at the border location of secondary forest and plantations, and station 3 is at a local plantation location. The data collected was obtained directly from the original source using the line transect method and nested plots to analyze vegetation at tree, sapling and seedling level, by looking at the type of vegetation found in each plot on the transect.

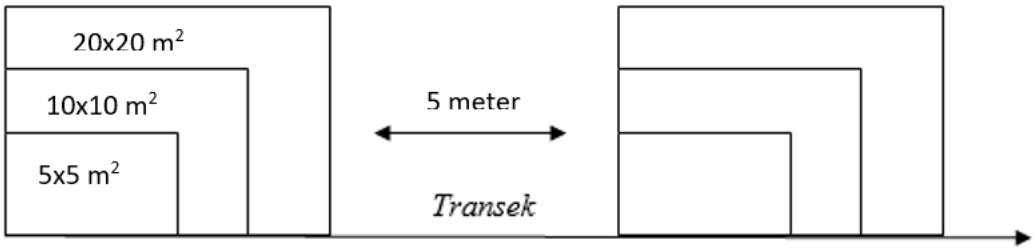

Figure 1. Sampling Design The plotted path used in data collection

Method Analysis Data

Data Which obtained furthermore analyzed by using:

The data that has been obtained is analyzed using the formula proposed by Fachrul, (2007) as follows:

1. Determination of Basal Area using the formula:

$$BA = \pi r^2$$

r = $\frac{K}{2}\pi$.

π = 3.14

Analyze vegetation using the formula:

a. Density (K)

$$K = \frac{\text{The total number of individuals of a species}}{\text{Observation plot area}}$$

Relative Density (KR)

$$KR = \frac{\text{Density of a species}}{\text{Ttotal density of all species}} x\ 100\%$$

b. Frequency (F)

$$F = \frac{\text{The number of plots found for a species}}{\text{The total of the entire plot}}$$

Relative Frequency (FR)

$$FR = \frac{\text{frequency of a species}}{\text{Total frequency of all species}} x\ 100\%$$

c. Dominance (D)

$$D = \frac{\text{The total basal area of a species}}{\text{area of observation plot}}$$

Relative Dominance (DR)

$$DR = \frac{\text{Dominance of a species}}{\text{Total density of all species}} x\ 100\%$$

Importance Index = Relative Density (KR) + Relative Frequency (FR) + Relative Dominance (DR)

RESULTS AND DISCUSSION

Habitat is an environment with certain conditions that can support the normal life of a species. According to Odum (1993), Habitat is a forested or non-forested area where certain organisms are found. Wildlife habitat is supported by biotic and abiotic components that are adapted to the needs of the wild animal, such as water, air, climate, vegetation, micro and macrofauna and humans (Alikodra 2002).

Based on the results of the research carried out, it was found that 55 types of plants were found in the Tarsius (Tarsius sp) habitat in the Popayato-Paguat landscape, which were distributed in 3 areas, namely primary forest areas, border areas and plantation areas (secondary forests). This species composition is very high when compared with the results of research conducted by Ekawati et al (2013), where the composition of vegetation types in the tarsier habitat in Kamarora Village, Lore Lindu National Park Area, is 30 plant species from 18 families. The high value of plant species composition found in the Tarsius (Tarsius sp) habitat indicates that the existence of the environment and ecosystem in the Popayato-Paguat Forest area is still very well maintained, this is supported by the awareness of the surrounding community about the importance of the existence of forest areas.

Tarsier have role important in ecosystem, that is functions

as an animal that controls insect populations with its status as an insectivore (insectivore). Tarsier is a genus of primates endemic to Sulawesi which is protected based on Permenlhk Number: P.106 of 2018 concerning protected plant and animal species. Tarsier is classified as a protected animal because this animal is categorized in the IUCN with vulnerable status and is listed in CITES appendix II as likely to become extinct due to wildlife trade. Until now, the Tarsier population tends to decline (IUCN 2012 in Lowing, et al. 2013).

Before catching and eating its prey, the tarsier will first observe the prey around 5-10 minutes, once it feels safe then tarsiers catch by jumping and grabbed it with his hand, next jump by flipping to the tree/original place (Wirdateti da nDahrudin, 2005). In this study, observations to determine the presence of tarsiers were carried out in the afternoon starting at 17:30 – 18:00 when the tarsier will leave the nest to start its activities at night, and in the morning at 05:00 – 06:30 when the tarsier will When you return to the nest to rest, the tarsier will make a loud sound. Based on research by Qiptayah and Setiawan (2012), tarsiers come out of the nest at around 18:00 WITA when they are looking for food. At that time the tarsier will make a sound to mark its territory, and the same thing happens when the tarsier returns to the nest. Tarsier sounds are easier to detect in the morning around 05:00 – 06:30, compared to in the afternoon.

Based on the results of research on tarsius (Tarsius sp) habitat at station I in the forest area, 28 types of vegetation were found which became tarsius (Tarsius sp) habitat. Of the 28 types of vegetation, 2 types of vegetation became nests for Tarsius sp , namely bamboo (Bambusa sp.) and plants. Sugar palm (Arenga pinnata). Bambusa sp and Arenga pinnata which are sleeping trees (nests) for Tarsiers are a safe place for tarsiers to protect themselves from predators and a place for them to take shelter from extreme weather. This is in accordance with what was stated by Wirdateti and Hadi Dahrudin (2006), that tarsiers choose to nest in bamboo (Bambusa sp). Based on vegetation analysis, the presence of Bamboo plant species is not found at tree level, but can be found in sapling level vegetation. Meanwhile, sugar palm plants are only found in tree level vegetation. This is in accordance with the statement (Bismark, 2012), that the composition of the stand structure and the dominant types at tree level and pole level are very determining for the availability of food sources, sleeping trees and means of movement. arboreal primates. The habitat of Tarsius sp at station 1 of the research in the Panua CA landscape forest area can be seen in Table 1.

Table 1. List of plant types as tarsier habitat and nests at Station 1

No	Nama Lokal	Nama Latin	Family	Penggunaan	
				Sarang	Habitat
1	Amplasan	*Ficus ampelas*	Moraceae		√
2	Anggrung	*Trema orientalis*	Ulmaceae		√
3	Aren	*Arenga pinnata*	Palmae	√	√
4	Awar-awar	*Ficus septica*	Moraceae		√
5	Bamban	*Donax canniforix*	Marantaceae		√
6	Bambu	*Bambusa sp*	Graminae	√	√
7	Bayur	*Pterospermum javanicum*	Malvaceae		√
8	Bulohu				√
9	Gondang	*Ficus fistulosa*	Moraceae		√
10	Jabon	*Neolamarckia cadamba*	Rubiaceae		√
11	Kakao	*Theobroma cacao*	Malvaceae		√
12	Kayu Bunga				√
13	Kayu Laban	*Vitex pinnata*	Verbenaceae		√
14	Kayu Pule	*Alstonia scholaris*	Apocynaceae		√
15	Kayu Timo	*Kleinhovia hospita*	Sterculiaceae		√
16	Kemadu	*Laportea stimulans*	Urticaceae		√
17	Lantoro	*Leucaena leucocephala*	Fabaceae		√
18	Ficus sp	*Ficus sp*	Moraceae	√	√
19	Mangga	*Mangifera indica*	Anacardiaceae		√
20	Nantu	*Palaquium sp*	Sapotacea	√	√
21	Pangi	*Pangium edule*	Flacourtiaceae		√
22	Pisang	*Musa paradiaca*	Musaceae		√
23	Pluncing	*Spondias sp*	Anacardiaceae		√
24	Rau	*Dracontomelon dao*	Anacardiaceae		√
25	Sapindus	*Sapindus sp*	Sapindaceae		√
26	Sti Kutil				√
27	Suruan	*Peperomia Pellucida*	Piperaceae		√
28	Waru	*Hibiscus tiliaceus*	Malvaceae		√

Source: 2023 Analysis Results

Based on the results of the vegetation analysis, Bambusa sp has an INP of 65.13% at the sapling level and 41.05% at the seedling level, while the Aren plant has an INP of 23.698% at tree level vegetation and an INP of 23.86% at seedling level vegetation. This illustrates that there is a guarantee of the survival of the Tarsius because there is good regeneration of bamboo plants and sugar palm plants from seedling level vegetation to sapling level vegetation and tree level vegetation, where bamboo plants and sugar palm plants are used as nests for the survival of the Tarsius. Apart from that, based on the results of research conducted at Station 1, Tarsiers were seen looking for food on Lamtoro, Sugar Palm, Awar-Awar, Bamban and Cocoa plants. Based on vegetation analysis, these 5 types of plants have quite high INP values at tree level, this illustrates that the habitat conditions of Tarsius at research station 1 in the Popayato-Paguat landscape area have a good level of stability and balance between the types of plants used as nests and types of plants used as places to find food.

Based on the results of research on tarsius (Tarsius sp) habitat at station 2 in the transitional forest area, 20 types of vegetation were found which are the habitat of Tarsius (Tarsius sp), this number is smaller when compared to the number of plants found at station 1. Based on the results of observations made from Of the 20 types of plants, there are 2 types of plants that become nests for Tarsius sp , namely the Rattan plant (Calamus rotang) and Ficus sp from the Moraceae Family . Tarsiers are thought to prefer trees Ficus sp. as a nest because the tree has roots that form small holes which the Tarsius uses as a tree to sleep in (nest). Wirdateti and Hadi Dahrudin (2006) in Lowing et al (2013) stated that one of the types of trees used by tarsiers as nests is the Ficus sp. because the roots of Ficus sp. which forms small holes so that the tarsier can

take shelter from rain and sunlight and avoid predators. According to Mustari, et al (2013) Characteristics of tarsier nests in secondary forests dominated by Ficus sp. which consists of two types of plants, where the main plant is covered by a second plant in the form of lianas.

The habitat of Tarsius sp at research station 2 in the transitional forest area in the Panua CA landscape can be seen in Table 2.

Table 2. List of plant types as tarsier habitat and nests at Station 2

No	Nama Lokal	Nama Latin	Family	Penggunaan	
				Sarang	Habitat
1	Amplasan	*Ficus ampelas*	Moraceae		√
2	Anggrung	*Trema orientalis*	Ulmaceae		√
3	Awar-awar	*Ficus septica*	Moraceae		√
4	Bamban	*Donax canniforix*	Marantaceae		√
5	Ficus sp	Ficus sp	Moraceae	√	√
6	Kakao	*Theobroma cacao*	Malvaceae		√
7	Kapok	*Ceiba pentandra*	Malvaceae		√
8	Karet	*Hevea brassilliensis*	Euphorbiaceae		√
9	Kayu Bunga				√
10	Kelapa	*Cocos nucifera*	Arecaceae		√
11	Kopi	*Coffe sp*	Rubiaceae		√
12	Langsat	*Lansium domesticum*	Meliacea		√
13	Lantoro	*Leucaena leucocephala*	Fabaceae		√
14	Mata Putih				√
15	Nantu	*Palaquium sp*	Sapotacea		√
16	Pisang	*Musa paradiaca*	Musaceae		√
17	Rotan	*Calamus rotang*	Arecaceae	√	√
18	Sapindus	*Sapindus sp*	Sapindaceae		√
19	Suruan	*Peperomia Pellucida*	Piperaceae		√
20	Waru	*Hibiscus tiliaceus*	Malvaceae		√

Source: 2023 Analysis Results

Based on vegetation analysis, the presence of the 2 types of plants used by Tarsiers as nests, namely Rattan plants and Ficus sp plants , are only found in sapling level vegetation, where Rattan has an INP value of 16.52% and Ficus sp plants have an INP value of 49.71%. Based on observations made at station 2, tarsiers were seen looking for food on coffee, awar-awar, bamban and cocoa plants. Based on vegetation analysis, these 4 types of plants have quite high INP values at tree level, this illustrates that the Tarsier habitat conditions at research station 2 in the transitional forest area in the Popayato-Paguat landscape have a good level of stability and balance between the plant types. used as suggestions and types of plants to use as a place to find food.

The habitat of Tarsius sp at research station 3 in the Panua CA landscape forest area can be seen in Table 3.

Table 3 List of Plant Types as Tarsius Habitat and Nests at Station 3

No	Nama Lokal	Nama Latin	Family	Penggunaan	
				Sarang	Habitat
1	Amplasan	*Ficus ampelas*	Moraceae		√
2	Anggrung	*Trema orientalis*	Ulmaceae		√
3	Bamban	*Donax canniforix*	Marantaceae		√
4	Bambu	*Bambusa sp*	Graminae	√	√
5	Bayur	*Pterospermum javanicum*	Malvaceae		√
6	Gamelina				√
7	Jati	*Tectona grandis*	Lamiaceae		√
8	Kakao	*Theobroma cacao*	Malvaceae		√
9	Kayu Bunga				√
10	Kayu Bugis	*Koodersiodendron pinnatum*	Anacardiaceae		√
11	Kelapa	*Cocos nucifera*	Arecaceae		√
12	Kendal	*Cordia Bantamensis*			√
13	Ketapang	*Terminalia catappa*	Combretaceae		√
14	Laban	*Vitex pinnata*	Verbenaceae		√
15	Lantoro	*Leucaena leucocephala*	Fabaceae		√
16	Matoa	*Pometia pinnata*	Sapindaceae		√
17	Nantu	*Palaquium sp*	Sapotacea	√	√
18	Rambutan	*Nephelium lappaceum*	Sapindaceae		√
19	Rotan	*Calamus rotang*	Arecaceae	√	√
20	Suruan	*Peperomia Pellucida*	Piperaceae		√
21	Waru	*Hibiscus tiliaceus*	Malvaceae		√

Source: 2023 Analysis Results

Based on the results of research on tarsius (Tarsius sp) habitat at station 3 in the plantation area, 21 types of vegetation were found which were the habitat of tarsius (Tarsius sp), of the 21 types of vegetation, 3 types of vegetation became nests for Tarsius sp , namely bamboo plants. (Bambusa sp) , Rattan plant (Calamus rotang) , Nantu plant (Palaquium sp) . According to Sinaga et al. (2009) Tarsiers inhabit secondary forests and shrubs consisting of grass and reeds. In this study, tarsiers used the bottom of dense bamboo groves in the form of deep holes. Tarmudji (1978), reported The sleeping places that tarsiers like are places covered with reeds and shaped like dark tunnels.

The results of vegetation analysis show that Bambusa sp has an INP of 57.7% at the sapling level, Calamus rotang has an INP of 10% for sapling level vegetation and Palaquium sp has an INP of 36.126% for tree level vegetation and 39.36% for sapling level vegetation. This illustrates that there is a guarantee of the survival of Tarsiers because there is good regeneration of bamboo plants (Bambusa sp) , Rattan plant (Calamus rotang) , Nantu plant (Palaquium sp) from seedling level vegetation to sapling level vegetation, where Bamboo plants (Bambusa sp) , Rattan plants (Calamus rotang) , Nantu plant (Palaquium sp) is used as a nest for survival by Tarsiers.

Apart from that, based on the results of research conducted at station 3, the plants planted are fruit-bearing plants which are a source of food and economic improvement for the surrounding community. Apart from having benefits and added value for the local community, this fruit-producing plant is a gathering place for insects which will be the main food source for tarsiers. Apart from that, plants that have a small diameter will become a place for the tarsier to rest as well as a location for marking its home range. Tarsiers were seen looking for food on Rambutan, Cocoa, Suruan and Bamban plants. Based on vegetation analysis, these 4 types of plants have quite high INP values at the tree level, this illustrates that the Tarsius habitat conditions at research station 3 have a good level of stability and balance between the types of plants used as suggestions and the types of plants used as places. to find food.

CONCLUSION AND RECOMMENDATION

Based on the description of the research results and discussion, the following conclusions can be drawn

Vegetation analysis at station 1 of the Lamtoro tree level has the highest INP value with a value of 27.129%; The sapling level of Bamboo plants has the highest INP value with a value of 65.13% and the seedling level of Bamboo plants has the highest INP value with a value of 41.05%. Tree level vegetation analysis at station 2, the Awar-awar plant had the highest INP value with a value of 47.586%; The sapling level of the Ficus sp plant has the highest INP value with a value of 49.71% and the seedling level of the Nantu plant has the highest INP value with a value of 45.19%. Vegetation analysis at station 3 level of Cocoa

trees had the highest INP value with a value of 57.442%; The sapling level of Bamboo plants has the highest INP value with a value of 57.70% and the seedling level of Nantu plants has the highest INP value with a value of 44.86%.

There are 55 types of plants in the Tarsius (Tarsius sp) habitat in the Panua CA landscape , which are distributed in 3 areas, namely primary forest areas, border areas and plantation areas (secondary forests). Bamboo plants and sugar palm plants were used as Tarsius nests at station 1, Rattan plants and Ficus sp plants were used as Tarsius nests at station 2, while at station 3 the plants used as nests were bamboo plants, Nantu plants and rattan plants.

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