

Description of *Rhyticeros cassidix* Feed in Makarti Jaya Landscape Area, Pohuwato

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ABSTRAK

Julang sulawesi (*Rhyticeros cassidix*) merupakan kelompok burung yang memiliki ciri khas berupa paruh yang besar dengan struktur tambahan pada bagian atasnya yang disebut balung (casque). *Rhyticeros cassidix* tergolong spesies terancam punah karena adanya tekanan habitatnya. Tekanan ini berupa hilangnya vegetasi yang menjadi pakan hewan tersebut. Penelitian ini bertujuan untuk mendeskripsikan pakan *Rhyticeros cassidix* di kawasan lanskap Makarti Jaya, Pohuwato. Metode penelitian ini menggunakan metode roaming. Terdapat empat stasiun yang dijelajahi dengan jarak tiap stasiun 400 meter. Keempat stasiun tersebut berada di kawasan lanskap Desa Makarti Jaya, Pohuwato, Gorontalo. Identifikasi jenis pakan *Rhyticeros cassidix* yang ditemukan dengan mencatat temuan pakan *Rhyticeros cassidix* disetiap area eksplorasi. Hasil penelitian ini menunjukkan terdapat 8 jenis pakan yang ditemukan, yaitu, Pohon (Drcontomelon dao), Bunga Kenanga (*Cananga odorata*), Pohon Palapi (*Heritiera javanica*), Beringin (*Ficus Benjamina*), Woka, (*Livistona altissima*), Nantu (*Palaquium quercifolium*), Matoa (*Pometia pinnata*), dan Kayu Bugis (*Koordersiodendrom pinnatum*). Pakan yang dikonsumsi *Rhyticeros cassidix* sangat bervariasi tergantung musim dan ketersediaan sumber pakan di kawasan lanskap Makarti Jaya dengan melakukan adaptasi yang baik dalam mencari dan memilih pakan yang sesuai dengan kebutuhan nutrisinya.

ABSTRACT

Rhyticeros cassidix is a group of birds that are easily recognized, because it has a characteristic in the form of a large beak with an additional structure at the top called balung (casque). *Rhyticeros cassidix* classified as endangered to critical species. This happens because of pressure on the habitat of these animals, including in the form of land use change which results in the loss of vegetation that feeds them. The aims of this study to describe the feed of *Rhyticeros cassidix* in the landscape area of Makarti Jaya, Pohuwato. The roaming method is used in this study. There are four stations explored with the distance at each station being 400 meters. The four stations are located in the landscape area of Makarti Jaya Village, Pohuwato, Gorontalo. Identify the type of *Rhyticeros cassidix* feed found by recording the findings of Sulawesi julang feed in each exploration area. The results showed that there were 8 types of feed found, namely, Rao Tree (*Dracontomelon dao*), Ylang Ylang Flower (*Cananga odorata*), Palapi Tree (*Heritiera javanica*), Banyan (*Ficus Benjamina*), Woka (*Livistona altissima*), Nantu (*Palaquium quercifolium*), Matoa (*Pometia pinnata*), Bugis Wood (*Koordersiodendrom pinnatum*). The feed consumed by *Rhyticeros cassidix* varies greatly depending on the season and the availability of feed sources in the Makarti Jaya Landscape area by having good adaptation in finding and choosing feed that suits their nutritional needs.

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1. INTRODUCTION

The Sulawesi Julang bird (*Rhyticeros cassidix*) is a fruit and grain-eating bird (Herbivore) (Aileen and Ruhidawati 2022). *Rhyticeros cassidix* belongs to the family Bucerotidae and is also one of the bioindicator components that regenerate forests by spreading seeds. Some researchers conclude that Julang can be used to detect environmental changes and can reflect habitat stability (Bamotiwa, Labiro, and Ihsan 2014). All types of Julang in Indonesia are protected animals through Law no. 5 of 1990 concerning the Conservation of Biological Natural Resources and their ecosystems, as well as government regulation no. 7 of 1999 concerning the preservation of plants and animals. Based on data from IUCN in 2016 that *Rhyticeros cassidix* is a protected animal because its population is already in a condition of near endangered (Near threatened) to critical (Critical endangered). The main threat from Julang is the loss of habitat to live and forage. In addition to pressure on its habitat, Julang also faces other threats such as poaching which is increasingly rampant for consumption and trade as pets and as home decorations (Pratama et al. 2021).

The high diversity of bird species in an area is supported by the high diversity of habitats, because habitat determines the availability of bird wildlife, in general habitat serves as a place to forage, rest, and breed (Mirnawati, Erianto, and Dewantara 2018). Forests are habitats that provide unlimited resources and have enormous benefits for wildlife including birds. If a habitat is disturbed it can cause changes in the components of that habitat, so that the habitat has the potential to become uninhabitable for the organisms living in it. According to Alikodra (2002) the place where wildlife lives that form a unit, can be used to find food, shelter, play, and a place to breed. In Law of the Republic of Indonesia Number 41 of 1999, a forest is an ecosystem unit in the form of a stretch of land containing biological natural resources dominated by trees in a natural alliance of their environment that cannot be separated from each other (Kusumaningtyas and Chofyan 2012).

The type of feed tree that dominates as Julang feed is banyan fruit (*Ficus Benjamina*) because it bears fruit every year and has calcium for Julang. *Ficus* trees are the main source of feed for golden Julang (Dahlan, 2015). According to Affandi and Winarni (2007), fruit from the *Ficus* type is a potential source of feed as feed for Bucerotidae. The selection of fruit from the type of *Ficus* as feed Bucerotidae is due to the high content of sugar and calcium (Wee et al., 2008). Hornbills are the largest type of fruit-eating birds (frugivory) among other fruit-eating birds, the fruits consumed by hornbills are categorized into small fruits in large quantities and types of fruits that have stones (stone seeds), namely, non-*Ficus* types and *Ficus* types (Poonswad et al., 1998 in Mardiasuti et al., 2011).

Makarti Jaya Village holds a lot of potential with the charm of natural beauty and flora and fauna, even in the future it can become one of the mainstay ecotourism villages in Pohuwato. A fertile area, rich in fruits that could be due to bordering river channels and forests that are still lush and dense. This village has been visited by many foreign tourists because it has a step bioconductivity, one of which is the smallest tarsier in the world. The Makarti forest area has a bird watching place or often called Kates and Iker U. According to community recognition before the land clearing, many hornbills were seen often moving to residential areas. It is suspected that land clearing and poaching resulted in the loss of hornbill activity that is often seen in daily activities to reduce the number of individuals at the observation site. With the increasing clearing of forests into plantations and agriculture, resulting in reduced habitat for animals, especially hornbills (Nur, Novarino, and Nurdin 2013). Based on this description, a

study was conducted that studied the description of *Rhyticeros cassidix* feed in the Makarti Jaya landscape area, Pohuwato

2. METHOD

Research Sites

This research has been carried out in July - December 2023. The place of research is carried out in the Makarti Jaya Landscape area, Taluditi District, Pohuwato Regency, Gorontalo Province

Research Methods

This research method uses a cruising method, where the wide roaming of each station is 400 m in four stations located in the Makarti Jaya landscape area, Pohuwato. Identification is carried out by recording the findings of Sulawesi Julang feed in each exploration area.

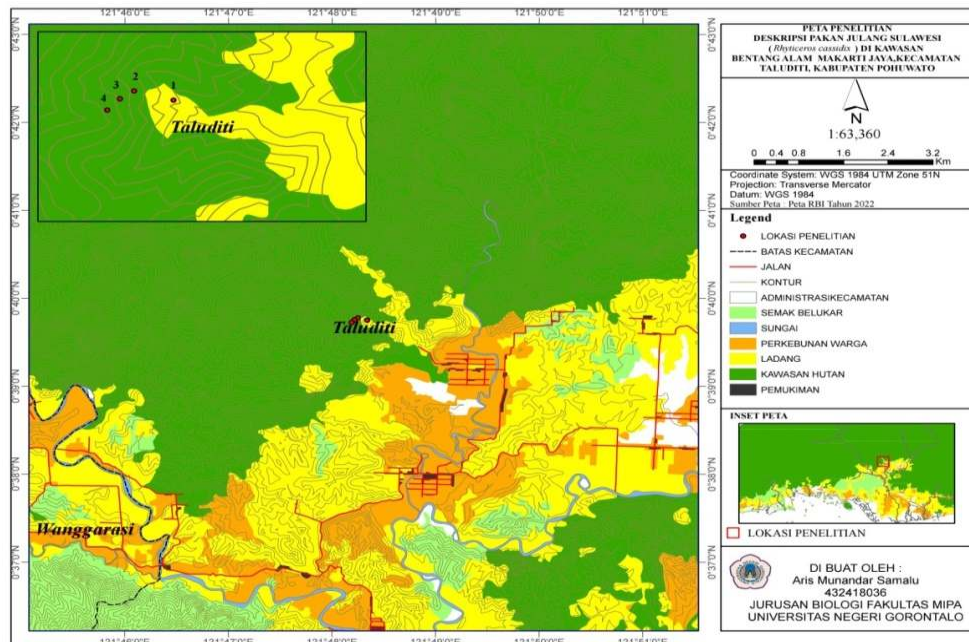


Figure 1. Map of the research location

Research Procedure

Observation

Observations were carried out with the aim of obtaining an overview of the location of Sulawesi julang feed trees.

Determination of observation location

The location chosen in this study is the landscape area of Makarti Jaya, Pohuwato. Some of the reasons for choosing the research site are as follows: 1) Because the location in the Makarti Jaya Landscape area allows the high potential for Sulawesi julang bird feed. 2) Makarti Jaya is a

assisted village of the Indonesian Bird Agency which covers the protection of forests and animals in landscape areas.

Conduct of research

Data retrieval is done by roaming method. Findings are marked through coordinate points using GPS and recorded.

3. RESULT AND DISCUSSION

Makarti Jaya Village has a mountainous area reaching 30% of its area of 12 thousand hectares which is included in the Popayato Paguat Landscape (BAPP) which stretches an area of 354,237.87 Ha. In the east-north-west part of this stretch is Nantu wildlife reserve to Marisa protected forest while in the south there is Panua Nature Reserve to Randangan protected forest. This landscape consists of hills and mountains dominated by the status of protected forest areas, production forests, limited production forests, and conservation forests.

The landscape area of Makarti Jaya holds a lot of potential with the charm of natural beauty and flora and fauna, one of which is (*Rhyticeros cassidix*). Hornbills occupy forest habitat types, both primary and secondary forests (Ramdhan et al. 2017). Furthermore, Ramdhan et al stated that the habitat must have a source of food and water that is used as food for Julang, so that the availability of feed / food greatly affects the presence of *Rhyticeros cassidix* in a habitat. Diverse vegetation conditions provide a variety of food required by hornbills.

In the Makarti forest area there is a bird watching place or often called Kates and Ieter U. Sulawesi Julang feed research was carried out in primary forests in the Makarti Jaya protected forest area. Geographically, the first station studied 51 N 0367102 UTM 0073245 112M elevation, the second station 51 N 0366935 UTM 0073291 192M elevation, the third station 51 N 03366875 UTM 0073252 215M elevation, and the fourth station 51 N 0366821 UTM 0073196 235M elevation. of these four stations are in protected forest areas (HL). According to Noor's research (1998), the habitat of the Bucerotidae bird group is primary natural forest or lowland rain forest which is overgrown with food-producing trees for Bucerotidae, namely the Moraceae (*Ficus*) family.

Result

Ficus is a food that Julang often consumes. *Ficus* is also a plant classified as a keystone species that holds a lot of potential to sustain life during the scarcity season. Scarcity season usually refers to a period when environmental conditions make it difficult for plants to bear fruit, this is caused by a variety of factors including prolonged drought, climate change, or other conditions. The type of feed most preferred by hornbills is figs which belong to the Moraceae family group which is a type of *Ficus* sp. and found in tropical forest areas (Tripa et al. 2018). Hornbills are a group of birds belonging to the family bucerotidae and are the largest species of fruit-eating birds (frugivory) among other fruit-eating birds, the fruit consumed by *Rhyticeros cassidix* is categorized in small fruits with a large number and types of fruit that have stones (stone seeds), namely nonfigus species and *Ficus* types (Worang and North 2023).

Several types of nonfigus feed from *Rhyticeros cassidix* found in forest areas include, Rao Tree (*Dracontomelon dao*), ylang ylang flower wood tree (*Cananga odorata*), Palapi tree (*Heteriera javanica*), Banyan (*Ficus benjamina*), Woka (*Livistona altissima*), Nantu (*Palaquium quercifolium*), Matoa (*Pometia pinnata*), Bugis wood (*Koordersiodendrom pinnatum*). However, only a few types of feed were found in the area, because at that time some types of feed trees were not in the fruiting phase so that there were only four types of feed found including, large and small banyan fruits (*Ficus benjamina*), ylang ylang fruit (*Cananga odorata*), matoa fruit (*Pometia pinata*), Bugis wood (*Koordersiodendrom pinnatum*).

Discussion

Based on the results of research that has been conducted in the Makarti Jaya Landscape area, there are 8 types of *Rhyticeros cassidix* feed classified as ficus and nonfigus. The reason why there are feeds classified as ficus and nonfigus is because *Rhyticeros cassidix* requires a variety of different nutrients to survive that can be found in different types of fruit. One of the favorite feeds of *Rhyticeros cassidix* is found in areas classified as Ficus, namely Banyan (*Ficus benjamina*), because it is a feed tree that tends to bear fruit throughout the season. However, in contrast to other feed trees such as *Pometia pinnata* or Matoa fruit whose fruiting season on this tree usually only occurs once a year.

Rao Fruit Tree (*Dracontomelon dao*)

Rao Fruit Tree or its scientific name *Dracontomelon dao* belongs to the family Anacardiaceae. Rao trees are included in the category of feed trees from Sulawesi julang. The fruits are edible. In addition, this rao fruit tree is often also known as dahu, sengkuang (Kalimantan), and basuong (Papua). Rao fruit trees grow scattered in lowland forests on Seram Island, but altitudes of 500 – 1000 m are rarely found. This type can grow on good to poor soil drainage, especially on alluvial soils and swampy areas. Propagation of ordinary plants using seeds. In one kg there are 520 – 620 seeds or 70 fresh fruits. *Dracontomelon dao* trees reach a height of 3 – 4 meters after 2 years and 6.5 meters after 5.5 years. In the field, the tree height reaches 55 m with a branch-free trunk as high as 25 m and a diameter of up to 150 cm (Lemnes, et al, 1995).

Lemnes, et al (1995). adding *Dracontomelon dao* or Rao Fruit Tree can be used as a plantation forest and used for a combination of agroforestry crops because of its shade-resistant nature. Seedlings can be grown without requiring special treatment in the field. Experiments on making plantation forests in Java, seeds were sown directly in the field with a distance of 1 x 3 m. The yield after 15 years of planting shows an annual increase in volume by 5.4 m³ / ha. In the international market the value of wood reaches US \$ 200 / m³, while sawn wood is US \$ 80 / m³ and good wood quality reaches 140 / m³. Ylang ylang (*Cananga odorata*)

The ylang ylang tree has a height of approximately 20 m, woody and branched trunks, dirty green. The leaves are single, ovate-shaped, pointed at the end, the base is flat and 10-23 cm long. The umbrella-shaped flowers appear in the armpits of young leaves of green flowers, after old yellow. The fruit belongs to the buni fruit, the color is green, oval in shape, approximately 2 cm long. (Sekar and Ferawati, 2019). Ylang ylang blooms at the age of 4-5 years and almost every year with a harvest time of 4 x a year. How to harvest is done by choosing flowers that are old and yellowish-green in color. Kenanga grows well in areas whose altitude is between 20-700 m, optimally 150 m above sea level with air temperatures of 25-30 degrees C and rainfall of 150-3000 m / year. Loves alluvial soils that are gray or brown. Plants grown in lowlands flower faster than those grown in high altitudes.

Cananga odorata has a height of approximately 20 m, woody and branched trunks, dirty green. The leaves are single, ovate-shaped, the tip is pointed, the peduncle is flat and 10-30 cm long. The flowers include green buni fruits of oval shape, approximately 2 cm long. The ylang ylang flower tree can be processed into essential oils, which contain saponins, flavonoids and polphenols, and has been marketed in Europe since 1864 as an ingredient in perfumes and soap fragrances. In Indonesia, ylang ylang oil is obtained by steam distillation. Kenanga is one of the medicinal plants that is efficacious as a medicine for menstrual pain. Sekar and Ferawati, (2019) added that the skin is used as a rope material for webbing, and the fiber material as a scab medicine. While the wood is used for plywood, finir, pulp, and wool board. In Central Java the wood is used for the coffin carpentry industry, sometimes for kentongan material. In West Java, the skin is used as a medicinal ingredient and fragrances hair. The ylang ylang tree can also be a protective tree.

Banyan Tree (*Ficus benjamina*)

Banyan trees have a large, upright trunk shape with a height of up to 35 meters or more. It has a canopy of round shape. The bark of the banyan tree trunk is grayish-white and has many dense and long breath roots. The leaves of this tree have a single arrangement and the leaf bones are parallel (Rahmawati and Dharmono, 2018). This banyan tree is a type of tree with a unique appearance, because there are hanging roots that are characteristic of this tree. In Indonesia, the banyan tree (*Ficus benjamina* L.) has a different name in each region. The Sundanese region calls it caringin, Java calls banyan and for Malay it is known as waringin *Ficus benjamina* L plant has a synonym, namely *Ficus nitida* Thunb. (Rahmawati and Dharmono, 2018). Stating this type of tree is one type of plant that is widely found in various regions of Indonesia. Banyan tree (*Ficus benjamina* L.) has a wide range of health benefits. One of them is the leaves and roots can be efficacious as an influenza medicine. *Ficus benjamina* is one of the plants of the Moraceae family that is easy to grow in various land conditions including dry land. Banyan trees include fast-growing plants with a growth rate of 65 mg-1 / day.

Ficus Benjamina or banyan is one type of plant that is found in various regions of Indonesia which is one of the foods of faforit julang. The fruit of this banyan tree is called the thick fleshy buni fruit, which is a fruit with an elongated round shape with a length of 05-1 cm. The color of the banyan fruit is divided into three according to its age. When it is young this fruit is green. When it is half cooked, it will be yellow. While the ripe fruit skin will be red. Banyan fruit includes compound fruits with the Syconus type, namely this fruit develops from hypanthodium inflorescence. Banyan fruit seeds are round white and have a hard texture, flattened and located on the inside of the fruit. The color of young seeds is usually pale yellow while the seeds on ripe fruits will be blackish. Basically, the function of seeds on banyan trees is for tree breeding tools (Rahmawati and Dharmono, 2018).

Medeon (*Polynesiac*)

Pometia piñata or matoa is a type of rambutan plant, or in biology comes from the rambutan-rambutanan family (Sapindaceae). Based on the color of the fruit skin, matoa is divided into three types, namely Emme Bhanggahe (Red Skin Matoa), Emme Anokhong (Green Skin Matoa), Emme Khabhelaw (Yellow Skin Matoa). Meanwhile, based on the texture of the fruit, matoa is divided into two types, namely coconut matoa and papeda matoa. Matoa coconut is characterized by chewy and lumpy fruit flesh like rambutan aceh, fruit diameter 2.2-2.9 cm and

seed diameter 1.25-1.40 cm. While matoa papeda is characterized by a slightly flabby and sticky flesh with a fruit diameter of 1.4-2.0 cm.

Nantu (*Palaquium quercifolium*)

The nantu tree (*Palaquium quercifolium*) belongs to the category of feed trees of the Sulawesi julang trees in the family Sapotaceae. It grows up to 30 metres (100 ft) tall. The bark of the trunk is red-brown. Its inflorescences produce up to 10 brownish tomentose flowers. The fruits are round, reaching 2 cm (1 inch) in diameter. *Palaquium quercifolium* is native to Sumatra, Kalimantan, Sulawesi and Ambon. Its habitat is lowland mixed dipterocarp forests and also swamp forests. *Palaquium quercifolium* grows in lowland primary forests to mountains from an altitude of 200 meters above sea level to 1500 meters above sea level. Utilization of nantu trees, leaves as traditional medicine of the polahi tribe while for fruits and seeds as food from Sulawesi julang (Lemmes et al, 1995).

Woka (*Livistona altissima*)

Woka is included in the category of feed trees from Sulawesi julang which is one type of palm included in the Liliopsida group or used to be called monocots (one-piece plants). The mature woka plant grows as a sturdy and tall tree, the trunk is large, grows upright and straight and brown in color. Woka trees can reach 15 meters in height, so they are categorized as tall trees. Fan-shaped leaves with coconut-like leaf palms, up to 38 cm in diameter, with leathery spiny edges. The leaf blades are round with holes in the middle, the upper and lower surfaces of the leaves are smooth (Siregar, 2005).

The Bugis (*Koordersiodendron pinnatum*)

The Bugis wood tree, also known by the botanical name *Koordersiodendron pinnatum*, is part of the family Anacardiaceae. This tree is generally spread in the regions of Kalimantan, Sulawesi, Maluku, Papua. It is interesting to know that Indonesia has around 4,000 species of trees that have the potential to be used as building wood. However, only about 400 species (10%) have economic value and even fewer, 260 species, have been classed as trade timber. The bugis wood tree is a single species in the genus *Koordersiodendron* belonging to the family Anacardiaceae. The origin of the tree is the territory of Malaysia, up to Papua New Guinea, including Borneo, the Moluccan Islands, the Philippines and Sulawesi. This tree can grow up to 49 meters in height and has a trunk diameter of up to 92 cm. The leaves are alternate, compound and have pen-like veins. The flowers are about 2 mm in diameter, white in color, and located in very long panicles. The fruit measures about 25 mm, yellow in color, and is drupa shaped with thick flesh. This tree usually grows in undisturbed forests up to a height of 800 meters, but usually falls below 500 meters. This tree is part of the wet tropical biome.

Palapi tree (*Heritiera javanica*)

The Palapi tree, or by its botanical name *Heritiera javanica* is part of the family Malvaceae. This tree is commonly found in Sumatra, Java, Kalimantan, and North Sulawesi. Palapi trees can grow to reach a height of 35-40 meters with a branch-free trunk length of 10-18 meters. The diameter of the trunk can reach 75-80 cm and the shape of the trunk is straight with a banir that can reach a height of 2.5 meters. The outer bark is pink or brown, sometimes gray, shallowly grooved and peeling. Palapi wood is quite difficult to sawn because it contains a lot of silica.

However, this wood is easy to dry and usually grows in dry low soil up to the foothills up to an altitude of 600 m above sea level.

4. CONCLUSION

From this study, it can be concluded that eight types of *Rhyticeros cassidix* feed were found in the Makarti Jaya Landscape area, namely Rao Tree (*Drancontomelon dao*), ylang ylang flower wood tree (*Cananga odorata*), Palapi tree (*Hetiriera javanica*), Banyan (*Ficus benjamina*), Woka (*Livistona altissima*), Nantu (*Palaquium quercifolium*), Matoa (*Pometia pinnata*), Bugis wood (*Koordersiodendrom pinnatum*). But of the eight types of feed found, there is one type of feed that is the staple food for *Rhyticeros cassidix*, namely *Ficus Benjamina* (Banyan), because banyan trees tend to bear fruit every year, while other feed only bear fruit once each year. The feed consumed by *rhyticeros cassidix* varies greatly depending on the season and the availability of feed sources in the Makarti Jaya landscape area by having good adaptation in finding and choosing feed that suits their nutritional needs.

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