



Identification and Potential of Yellow Root Plants in the Pining Forest Area, Gayo Lues Regency

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ABSTRAK

Kabupaten Gayo Lues khususnya kecamatan Pining memiliki kawasan hutan dengan keanekaragaman hayati yang paling beragam dan produktif salah satu jenis tumbuhan yang dimanfaatkan sebagai bahan obat adalah akar kuning. Penelitian bertujuan untuk mendapatkan informasi tentang jenis akar kuning dan potensi banyaknya jenis akar kuning yang terdapat di kawasan Areal Penggunaan Lain (APL) Bur Kaladurin Kecamatan Pining, Kabupaten Gayo Lues. Pengumpulan data dilakukan dengan metode sistematis sampling untuk menggambarkan kondisi populasi data setiap jenis tumbuhan akar kuning, data diameter akar kuning dan data jumlah akar kuning yang ditemukan. Ditemukan 2 jenis akar kuning yaitu *Fibraurea tinctoria* dan *Arcangelisia flava* sebanyak 1675 individu pada lokasi penelitian dari 56 plot sampling yang ditentukan. Kerapatan tertinggi pada setiap plot yang ditemukan adalah jenis *Fibraurea tinctoria* dengan kerapatan 613 individu/ha dan jenis *Arcangelisia flava* 135 individu/ha. Frekuensi kelas diameter terbanyak yang ditemukan dari kelas 2,66 – 4,26 cm sebanyak 452 individu dari jenis *Fibraurea tinctoria* dan *Arcangelisia flava* sebanyak 102 individu dari kelas diameter 2,55 – 3,92 cm.

ABSTRACT

Gayo Lues Regency, especially Pining District, has the most diverse and productive forest area with biodiversity, one of the types of plants used as medicinal materials is yellow-fruited moonseed. The study aims to obtain information about the types of yellow-fruited moonseeds and the potential for many types of yellow-fruited moonseeds found in the Bur Kaladurin Other Use Area (APL), Pining District, Gayo Lues Regency. Data collection was carried out by systematic sampling method to describe population conditions, data on each type of yellow-fruited moonseed plant, yellow-fruited moonseed diameter data and data on the number of yellow-fruited moonseeds found. 2 types of yellow-fruited moonseeds, namely *Fibraurea tinctoria* and *Arcangelisia flava*, were found as many as 1675 individuals at the study site from 56 specified sampling plots. The highest densities in each plot found were *Fibraurea tinctoria* with a density of 613 individuals/ha and *Arcangelisia flava* 135 individuals/ha. The highest diameter class frequency found from the 2.66 – 4.26 cm class was 452 individuals from the *Fibraurea tinctoria* and *Arcangelisia flava* species as many as 102 individuals from the 2.55 – 3.92 cm diameter class.

1. INTRODUCTION

Tropical forests in Indonesia are the most biodiverse and productive forest areas (Brandon, 2014). Indonesian people, in their daily lives, use plants in five categories of utilization such as the use of plants as foodstuffs, for household tools, for building materials and as traditional ceremonies and medicines (Rusman, 2009). One type of plant that is utilized as a medicinal material is yellow-fruited moonseed (*Arcangelisia flava*, L (Merr)).

Although yellow-fruited moonseed is currently not as well-known as other medicinal such as bajakah plant, however, the potential and market demand for yellow-fruited moonseed in Indonesia is expected to increase along

with the emergence of public awareness to return to nature in using natural medicines from plants. This is also reinforced by the increasing number of herbal medicine, pharmaceutical and cosmetic industries so that yellow-fruited moonseed is one of the biopharmaca commodities in the forestry sector that has the opportunity to be developed (Indartik, 2009).

Currently, one of the province that utilize yellow-fruited moonseed is Kalimantan. According to Noorcahyati (2016), yellow-fruited moonseed harvesting in Kalimantan still relies on its natural habitat, especially those in secondary forests and old rubber plantations. yellow-fruited moonseed harvesting is usually harvested from the roots and

stems. Utilization of the roots and stems threatens the survival of this liana-habituated plant. In addition, exploitation without cultivation efforts causes the existence of yellow-fruited moonseed to continue to decline (Noorahyati, 2016).

Another study in Kalimantan, precisely in Kereng Bangkirai Village, Sebangau District, Pulang Pisau Regency, Central Kalimantan Province, states that another name for yellow-fruited moonseed is yellow bajakah. The results of identification conducted by Oliver (2021) that two types of bajakah were found, namely yellow bajakah plants with the Latin name *Fibraurea tinctoria* Lour and red bajakah with the Latin name *Uncaria acida* (Hunter) Roxb. This indicates that yellow-fruited moonseed plants have a unique and large diversity.

Gayo Lues Regency, especially in the Pining District, has abundant non-timber forest products as medicinal plants, one of which is this yellow-fruited moonseed plant. However, many people still do not know what kind of yellow-fruited moonseed is found there or how much this plant's potential grows. The Pining Forest Area is a source of life for the people in the Pining Sub-district because forests with steep mountains surround its location. The forest status of the Pining Forest Area is included in the Other Use Area (APL) which dominantly has a diversity of flora and fauna with a preserved forest ecosystem. People who live or settle around the Pining Forest Area mostly utilize forest products in the form of fruit and palm sap, while this liana-type plant is still underutilized or not utilized at all. The lack of information about the potential of yellow-fruited moonseed plants in the Pining Forest area can cause this.

The importance of recognizing the existence of yellow-fruited moonseed plants is to provide information about the types of yellow-fruited moonseed plants in the Pining Forest Area and to know the potential growth distribution of yellow-fruited moonseed plants so that later data on the number of densities and the amount of yellow-fruited moonseed diameter found will be obtained. This research activity is expected to be helpful, especially in increasing community knowledge about the natural resources around them. It is also expected as scientific information material so that this plant can become one of the leading commodities that can be developed in Gayo Lues Regency, accompanied by cultivation and conservation efforts so that this plant can be preserved.

2. METHODS

This research was conducted from July 24 to August 24, 2023, in Pining District, Gayo Lues Regency APL Bur Kaldurin area, which is still forested. The method used in this study was systematic sampling, with a sampling intensity of 3% of the Bur Kaladurin APL area of 75 ha, so the number of plots in the research area was determined as 56. The number of plots was obtained using the formula :

$$\text{Plot number} = \frac{\text{area of the entire plot observed}}{\text{measurement plot area}}$$

Area of all observed plots = IS x Area (Simmon, 1996).

Area of all plots observed at Bur Kaladurin = 3% x 75 Ha = 2,25 Ha

Number of plots = 2,25 Ha/0,04 = 56,25 = 56 plots

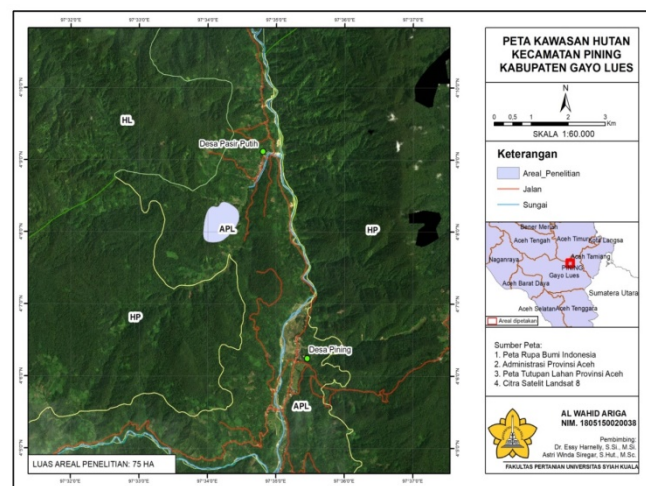


Figure 1. Map of APL Research Area Bur Kaladurin Pining Sub-district.

Data Collection Technique

The types of data used in this research are primary and secondary. Primary data is from field results such as data on each type of yellow-fruited moonseed plant taken for identification purposes, yellow-fruited moonseed diameter data, and the number of yellow-fruited moonseed in the APL area plot of Bur Kaladurin, Pining District. Secondary data is from other parties in the form of ready-made data that supports primary data obtained from agencies, scientific journals, books, literature studies, area boundaries, and area areas from environmental leaders in Pining Village.

Vegetation Density Analysis

Vegetation density is the ratio of a species of vegetation or plants that live in a particular area, known later after analyzing the type of vegetation data collected in the field. Density (K) is the number of individuals per unit area or unity of space (Gopal & Bhardwaj, 1979) in Indriyanto (2008). The calculation uses the formula (Mueller-Dombois & Ellenberg, 1974) as follows:

$$Ki = \frac{\sum ni}{A}$$

Description:

Ki = yellow-fruited moonseed density of type i

$\sum ni$ = Number of individuals of type i

A = Measurement plot area

Diameter Potential Analysis

To determine the potential diameter of yellow-fruited moonseed plants, a classification of diameter classes is carried out, from diameter data found in the field. The calculation uses the frequency distribution formula. Frequency distribution is the grouping of objects into a-b-shaped groups, which are also called interval classes. This interval class is sorted from the smallest data value to the largest data value. The things that need to be done to make a frequency distribution list are as follows:

Determine the range, which is the largest data minus the smallest data.

- a. Determining the number of interval classes required based on Sturges' rule, many classes can be taken based on the formula:

$$K = 1 + 3,3 \text{ Log } N$$

$$Ci = \frac{R}{K}$$

K = Number of classes

R = Largest value - Smallest value

Ci = Class interval

3. RESULT AND DISCUSSION

a. Vegetation Density Analysis

Based on the results of research conducted in Bur Kaladurin, Pining Subdistrict, Gayo Lues Regency, from 75 ha of research footage, two types of yellow-fruited moonseed were found. The two species are *Fibraurea tinctoria* and *Arcangelisia flava*. Each of these species has a different number of individuals. The results can be seen in Table 1.

Table 1. Data on yellow-fruited moonseed species found in Bur Kaladurin

No	Local Name	Indonesian Name	Scientific Name	Number of Individuals (ind)
1.	Uyet using	Akar kuning	<i>Fibraurea tinctoria</i>	1372
2.	Uyet using	Akar kuning	<i>Arcangelisia flava</i>	303
Total				1675

Table 1 shows that the total number of roots found was 1675 individuals along with saplings consisting of *Fibraurea tinctoria* and *Arcangelisia flava* species. The most common yellow-fruited moonseed species is the *F. tinctoria* species with 1372 individuals, the largest number comes from the large number of saplings found, while the least yellow-fruited moonseed species is the *A. flava* species with 303 individuals. This is because in the location in previous years yellow-fruited moonseed harvesting has been carried out so that the number left behind is small.

Based on the exploration of yellow-fruited moonseed stands in Bur Kaladurin, Pining District, Gayo Lues Regency, the presence of *A. flava* plants is less than its relative *F. tinctoria*. Data on plant density values were obtained from measuring the diameter of the stems found and not calculating the density value of the number of tillers. Results are presented in Table 2.

Table 1. Density data of yellow-fruited moonseed plant

No	yellow-fruited moonseed type	K (ind/ha)
1.	<i>Fibraurea tinctoria</i>	613
2.	<i>Arcangelisia flava</i>	135
Total		747

Table 2 shows that the potential yellow-fruited moonseed density of *F. tinctoria* was found to be greater than 613 individuals/ha and *A. flava* 135 individuals/ha from a sampling area of 75 ha. This value is less when compared to research from Kalima (2021) where the density of yellow-fruited moonseed in Peat Swamp Forest, Kapuas Regency, Central Kalimantan Province was 625 individuals/ha of *F. tinctoria* in an area of 0.2 ha. As for the type of *A. flava*, the

data obtained is greater than the results of research from Yoandri et al. (2022) where the density of yellow-fruited moonseed plants in Gohong Village, Pulang Pisau Regency, Central Kalimantan, is 0.188 individuals/ha in an area of 0.4 ha.

a. Diameter Potential Analysis

Based on the results of the study, data on the diameter class and plant frequency values of the yellow-fruited moonseed species *A. flava* were obtained. Table 3 shows that the lowest frequency is in the diameter class of 6-13 cm, because people collect yellow-fruited moonseed that only have a large trunk diameter. In Hastari and Octavianus (2021) said that the size of the liana will increase along with the increase in the diameter of the host tree trunk it is wrapped around. The diameter of the yellow-fruited moonseed taken by collectors are roots ranging in diameter from 5 cm to the largest of 13.58 cm. Given the size class, individuals rooted in the plot were more numerous, so diameters greater than 1.0 cm were considered as mature individuals (Gerwing et al., 2006). Data on the diameter class and number of frequencies of yellow-fruited moonseed of *A. flava* species found in the field are presented in Table 3 below:

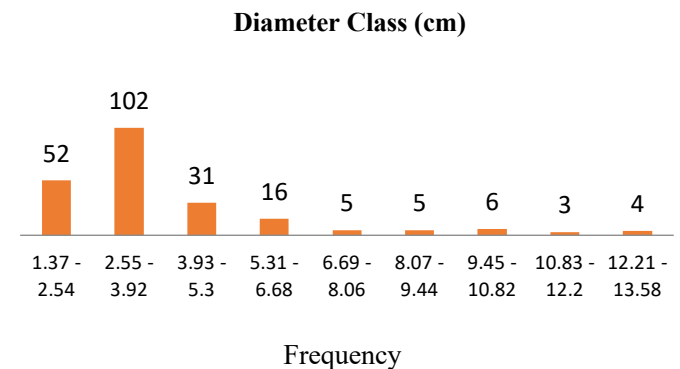


Figure 2. Diameter class and yellow-fruited moonseed frequency values for *A. flava* species from an area of 75 ha (56 plots)

The largest diameter class found in the diameter of 2.55 - 3.92 cm indicates that the diameter size is not or has not been harvested at all because of its small size and the weight will also shrink if left and not immediately sold to collectors. The size of the diameter of yellow-fruited moonseed collected by yellow-fruited moonseed collectors for sale was found to vary.

Table 4 shows that the frequency of yellow-fruited moonseed of the *F. tinctoria* species in the Bur Kaladurin area of Pining Subdistrict in August 2023 was quite a lot compared to the *A. flava* species. This is because the harvesting of yellow-fruited moonseed in the previous year had been carried out but still left quite a lot of this happened because the population could reproduce faster. In accordance with table 4, the size of the diameter class 2.66 - 4.26 is found more than the diameter class 5.88 - 14.01, this is because the diameter class is not taken because it is considered to have a small diameter and has no potential for sale. Due to the huge demand for industrial consumption needs, the yellow-fruited moonseed are cut down first to meet market needs (Ramasubbu et al., 2012).

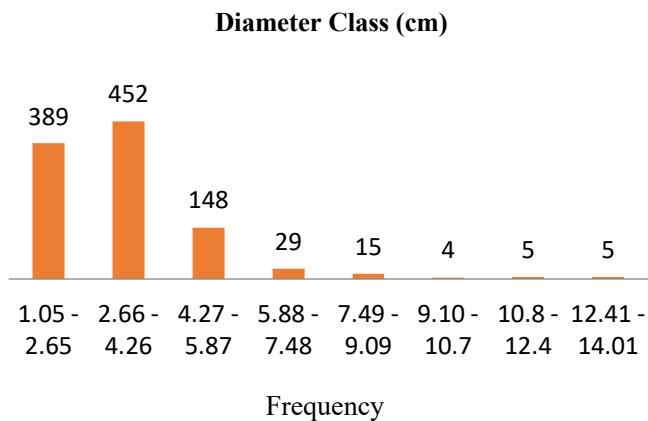


Figure 3. Diameter class and yellow-fruited moonseed frequency values for *A. flava* species from an area of 75 ha (56 plots)

Based on the frequency data in Table 4, it can be seen that the highest number of frequencies is in the diameter class 2.66 - 4.26 cm as many as 452 individuals, followed by the class 1.05 - 2.65 cm as many as 389 individuals. This is because the diameter is too small to be exploited, the community also feels that it is not profitable when compared to exploiting larger diameters.

The least frequency was also found in the 9-14 cm diameter class in the *F. tinctoria* species because at that diameter it had been taken beforehand by people looking for yellow-fruited moonseed because it has a heavy mass of scales and has economic value in buying and selling yellow-fruited moonseed. In Shankaraghatta's research (2015), said that none of the individuals recorded were more than 3.5 cm in diameter, although in previous forest department records there were lianas measuring more than 25.0 cm in diameter.

4. CONCLUSION

Based on the results of the research on Identification of Types and Potential of yellow-fruited moonseed Plants in Pining Forest Area, Gayo Lues Regency, it can be concluded that:

- There are 2 types of yellow-fruited moonseed plants found in the Pining Bur Kaladurin forest area of APL areas that are still forested, namely the types of *Fibraurea tinctoria* Lour, and *Arcangelisia flava* Merr.
- The most potential density is dominated by the type of *Fibraurea tinctoria* with a density of 613 individuals / ha and the type of *Arcangelisia flava* is less as many as 135 individuals / ha.
- The diameter class 2.55 - 3.92 cm is the most diameter class interval found from the yellow-fruited moonseed species *Arcangelisia flava* with a frequency of 102 individuals and the highest frequency of the yellow-fruited moonseed species *Fibraurea tinctoria* is from the diameter class 2.66 - 4.26 cm as many as 452 individuals.

5. RECOMENDATION

Further research is needed on a more detailed identification of yellow-fruited moonseed species, and it is recommended that the Pining community be better at utilizing yellow-fruited moonseed plants so that their sustainability and population are maintained and for the government to provide guidance and development of yellow-fruited moonseed so that people better understand and understand the uses of yellow-fruited moonseed plants.

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