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Mangifera species diversity on the riverbank of Bantuil Village, Barito Kuala Regency, South Kalimantan

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ABSTRACT

Mangifera is one of the 68 genus in the Anacardiaceae family. *Mangifera* is mostly utilized by the community for human needs such as food and economic sources and can be used as material for shelter needs. The purpose of this study was to describe the diversity of *Mangifera* in Bantuil Village, Barito Kuala Regency. The method used in this research is a descriptive approach with a total cruising technique on riverbanks in Bantuil Village, Barito Kuala Regency along \pm 3000 meters on the diversity of *Mangifera* species on the riverbanks of Bantuil Village, Barito Kuala Regency. The results showed that 5 types of *Mangifera* were found, namely, *Mangifera indica* L., *Mangifera odorata* (kweni), *Mangifera foetida* (hambawang), *Mangifera casturi* Kosterm (kasturi), and *Mangifera caesia* (binjai). *Mangifera indica* L. has 5 varieties, namely *hampalam*, *golek* mango, *manalagi* mango, *gadung* mango and apple mango.

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Introduction

The number of plants in an area can start from low plants to high plants have a lot of diversity. According to Shiva biodiversity is a term used to describe the many different forms of life that exist on earth starting from the smallest organisms that only have single cells to more complex high-living organisms¹. Biodiversity includes habitat diversity, species diversity and genetic diversity in nature.

Plants have a lot of diversity from low plants to high plants that can be found in various areas in nature both in forests, mountains, coastal areas, in and on the surface of the water, swamps, and also on riverbanks. Riverbanks are areas to the left and right of the river that are inundated or exposed to overflowing water when the river experiences high tide. In the Government Regulation of the Republic of Indonesia No. 38 of 2011 concerning rivers, it is explained that riverbanks are areas that are on the edge of the trough from the river to the foot of the inner embankment which is located on the left and right sides of the river trough.

South Kalimantan is an area that has many rivers, earning the nickname the city of a thousand rivers. One of the rivers in South Kalimantan is the Barito river which is the longest

river in the South Kalimantan region. The Barito River also flows to Barito Kuala Regency, one of which is Bantuil Village.

Bantuil Village is the place of data collection. Bantuil village has a very diverse flora and the area has not been widely known by the public, so it is necessary to disseminate information about the area with its richness and also the utilization of natural resources in the South Kalimantan area, both fauna and flora.

The Bantaran Sungai Desa Bantuil Barito Kuala Regency has many plants that live in the area, one of which is of the *Mangifera* species. Mango plants are commonly known as *mempelam* according to Bompard there are 31 species of which 28 can be found in Kalimantan, which is the center of origin of the distribution of mango species in Indonesia².

Method

The method used in this study is a descriptive approach to the diversity of *Mangifera* species on the banks of the Bantuil village river, Barito Kuala Regency. The research was conducted in March 2022 by going directly to the field or data collection area using the total cruising technique on riverbanks in Bantuil Village, Barito Kuala Regency along ± 3000 meters. The samples obtained were then documented in their natural habitat and described. The results of the description of the diversity of *Mangifera* species found were analyzed descriptively using literature review.

Results and Discussion

Based on the results of the research conducted, the diversity of *Mangifera* species found on the riverbanks of Bantuil village, Barito Kuala Regency, there are a total of 5 types of mangoes, namely *Mangifera indica* L., *Mangifera odorata* (kweni), *Mangifera foetida* (hambawang), *Mangifera casturi* (kasturi) and *Mangifera caesia* (binjai). There are 5 varieties of *Mangifera indica* L. namely mango *hampalam*, mango *golek*, mango *manalagi*, mango *gadung* and mango apple.

1. *Mangifera indica* L.

Mangifera indica L. has 5 varieties found in the research site, namely *hampalam*, *golek* mango, *manalagi* mango, *gadung* mango, and apple mango. Each mango found has characteristics that are only owned by its variety.

a. *Hampalam*

This mango has a tree habitus with a taproot root system that grows towards the center of the earth. The stems and roots of this plant have a grayish brown color and also include board roots (banir). The stem is round and has a height between 4.7-8.6m, and a stem diameter between 22.3-27.4 cm and sympodial branching.

Hampalam is leafy with a single type that is scattered in arrangement. Elongated leaves have flat edges, pointed tips and bases and smooth surfaces. 6-15 cm long and 3-5 cm wide. Flowers are arranged in 1 cluster as compound flowers. petals and corolla number 5-8 and are attached. Stamens and stamens number 1-2 and are attached. Mango *hampalam*, also known as tamarind by the surrounding community, has a green fruit with a slightly flattened shape.



Fig 1. *Mango hampalam*

b. *Mango Golek*

This mango has a tree habitus with a taproot root system and has root characteristics that grow towards the center of the earth. The stems and roots of this plant have a brownish color and also plank roots. The stem is round and has a height of between 5.5-6 m, and the diameter of the stem is between 17-24.3 cm and sympodial branching and the direction of growth of this stem is upward.

Single-leafed type that is scattered in arrangement. Elongated shape with flat edges, and smooth surface. The base and tip are tapered. Length between 8-16 cm and width between 4-6.2 cm. Flowers are arranged in a compound flower cluster at the end of the shoot. The number of petals and corolla is 5-8 with an attached state. There are 1-2 stamens that are attached. Stamens are 1 with an attached state. The white stalk is 1 with an attached state. *Mango golek* has a slightly long fruit shape with green skin and thin white spots like wax.



Fig 1. *Mango golek*

c. *Mango manalagi*

This mango has a tree habitus with a taproot root system that grows towards the center of the earth. The trunk and roots of this plant have a grayish brown color and are also banir roots (board roots). The round stem has a height between 4.2-5.2 m, and a diameter between 15.4-18.2 cm. It is sympodial with upward direction of growth.

Manalagi has a single leaf type that is spread out. They are elongated, flat-edged, and wavy on the surface. The length is between 15-20 cm and the width is between 6-9.3 cm. Flowers are clusters of compound flowers. Located at the bud end. The number of petals and corolla is 5-8 and attached. Stamens and stamens are 1-2 and attached.

Mango manalagi has a fruit with a rounded slightly oval shape with green skin that has white spots that will turn brown when the fruit is ripe.



Fig 2. *Mango manalagi*

d. *Mango gadung*

This mango has a tree habitus with a taproot root system that has root characteristics that grow towards the center of the earth. The stems and roots of this plant have a brown color and are also banir roots (board roots). The stem of this plant has a height range of 6.5-15 m, with a diameter ranging from 25-37.5 cm. Branching on this stem is sympodial, with a round stem shape and the direction of growth of this stem is upward.

Leafy with a single type that is scattered. The shape is elongated and the edges are flat, with a smooth top. The length is between 15-23.5 cm and the width is between 4-15 cm. *Mango gadung* which has a fruit that is almost the same as *hampalam* only slightly larger and slightly oval in shape and slightly tapered with green fruit skin color when young and turns yellowish when ripe.



Fig 3. *Mango gadung*

e. Apple mango

This mango has a tree habitus with a taproot root system and has root characteristics that grow towards the center of the earth. Including board roots (banir). The height is 2.8-3.4 m, with a diameter of 12.4-14.9 cm. Including sympodial and the direction of growth of this stem is perpendicular or upward growth direction.

Single leaf type located scattered. Lanceolate shape with flat edges, and smooth surface. They are 7-10 cm long and 3-4.3 cm wide. Includes compound flowers at the end of the stem. The petals and corolla are pale yellow with attached conditions. stamens and stigma number 1 The flower stalk is red.

Apple mangoes, as the name implies, are the result of a cross that has a shape similar to apples, which are round with a dark green color and will turn reddish green when ripe and have greenish-white spots on the skin.



Fig 4. *Apple mango*

2. *Mangifera odorata*

Mangifera odorata or commonly known by the community as *kuwini* has a tree habit with taproot and has a nature towards the center of the earth. The trunk and roots have a dark brown color and are also board roots (*banir*). Its height is between 4.7-8.5 m, with a diameter between 20-27.5 cm. This plant has a sympodial branching type with a round stem shape and has an upright growth direction.

The leaves are elongated, flat-edged, wavy top with a single leaf type whose layout surrounds the twigs. Leaf length ranges from 15-23 cm and leaf width ranges from 5-8.7 cm. The flowers are conical and wide at the bottom. It has bright red petals and crowns and the stalks are red in color and attached. In each series of flowers have double sex (hemaprodite).

The fruit on this plant has an oval shape with a stalk located at the base of the center of the fruit. The top of the fruit is pointed and the base is round and has no indentation. The skin of this fruit tends to be thick and smooth, having a layer of waxy substance with sparse beetles with a faded green or whitish color. The flesh has a soft and juicy texture. It is a fleshy stone fruit with coarse fibers and a bright yellow flesh color.



Fig 5. *Mangifera odorata*

3. *Mangifera foetida*

Mangifera foetida or commonly known by the local community as *hambawang* has a tree habitus with a taproot root system and has root characteristics that grow towards the center of the earth. Stems and roots are gray brown and do not include board roots (*banir*). The height is 7.5 m, and the diameter is 23.6 cm. the stem is sympodial. The direction of growth is upward. The stem is shallowly broken, or coarsely grooved.

The leaves are single type that surround the twig. They are elongated, flat-edged. They are between 15-23 cm long and 5-8.7 cm wide. Includes compound flowers in clusters at the end of the stem. The number of petals and corolla is 5-8 with an attached state. Stamens and stamens are 1-2 attached. The fruit has an oval shape like an egg, green to yellowish in color, has spots and has lenticels. When the fruit is ripe, the flesh has a yellowish orange color, with a sour and sweet taste and a very fragrant aroma.



Fig 6. *Mangifera foetida*

4. *Mangifera casturi*

Mangifera casturi or often known by the public as kasturi has a tree habitus with taproot and the nature of its growth towards the center of the earth, brown in color and including board roots (banir). Its height is between 4.5-15.4 m, has sympodial branching. The direction of growth is perpendicular or upward. The leaves on kasturi plants are scattered and single type.

Leaves are elongated, flat-edged and the top of the leaf has a smooth texture. The length is between 22.5-29cm with a width between 4.5-5.8cm in greenish color. Kasturi flowers are compound flowers that are racemose in shape and have tight hairs. The length of the flower stalk is approximately 28cm. It has petals with an elongated ovoid shape. The stamens have the same size as the crown. The manga kasturi fruit has a rounded oval shape at the bottom with a size of 5-6cm long and 4-5cm wide. The skin of the kasturi fruit is thin which has a bright to dark green color and has dark spots and if the fruit is ripe because of these spots, the skin will turn blackish. The flesh has a dark orange color with lots of fiber. Kasturi fruit has a sweet taste and a very fragrant odor.



Fig 7. *Mangifera casturi*

5. *Mangifera caesia*

Mangifera caesia or often known by the community as binjai has a tree habitus with a taproot root system and has root characteristics that grow towards the center of the earth. The stems and roots of this plant have a brownish color and are not plank roots. Its height is between 10-20m, with a diameter ranging from 45-90 cm. The bark is cracked with a blackish ash brown color. the direction of stem growth is straight up with sympodial branching.

The leaves are single type that are scattered. Lanceolate or pointed arch-shaped with a length of 8-10cm and a width of 2.3-10cm. It has a green color with a parchment-like texture. Arranged in panicles at the ends of twigs, 15-40 cm, the flowers are lush with many branches. Pale pink in color, with a total of 5, and has a fragrant smell, stripe-shaped petals, and purplish on the juice stalk.

The fruit is oval in shape with a greenish-brown skin color with white and soft flesh. and thick sweet binjai has a smaller size compared to sour binjai, and has rough fibrous flesh.



Fig 8. *Mangifera caesia*

The condition of an area both biotic factors and abiotic factors can determine the growth and development factors of plant life such as *Mangifera* species. According to Michael environmental factors that can affect the growth and development of a plant are air temperature, soil pH, soil moisture, air humidity, wind speed, light intensity, salinity and soil organic content³. At the time of the research, the environmental factors observed and measured included temperature, wind speed, light intensity, air humidity, and soil acidity and moisture.

The air temperature measurement carried out in Bantuil Village, Barito Kuala Regency was 31°C. At the time of the air temperature measurement, the conditions in Bantuil Village were quite hot. According to Permadi, mangoes are suitable for planting in lowland areas with an optimum temperature of 24°C to 27°C and have a strong dry season with low to medium volume rainfall⁴. Meanwhile, according to Rahayu, *Mangifera* species can still live at temperatures of 4-10°C even though they do not develop well⁵. Meanwhile, if the temperature reaches 45°C with additional high wind speeds it can cause burning or damage to the fruit.

Wind speed plays an important role in agriculture, especially for plants. Wind speed has an important role in the spore dispersal process. The wind speed measured in Bantuil Village, Barito Kuala Regency ranged from 0.6-1.4 m/s. In the measurement results the wind speed was quite strong. According to Triani the results of wind speed measurements taken are still classified as normal because the wind speed of a place can be planted with *Mangifera* species with a range below 1.9-2 m / s. Because this can affect the productivity of the plant⁶. Because this can affect the productivity of the mango plant.

Measurements of light intensity in Bantuil Village, Barito Kuala Regency ranged from 18371-> 20.000 Lux, so it can be seen that the light intensity in Bantuil Village, Barito Kuala Regency is sufficient to support the growth of the *Mangifera* species. *Mangifera* species is one of the tropical plants that in its growth requires sunlight or sufficient light intensity. According to Rahayu, *Mangifera* species in a day require 6 hours of sunlight. During the day the light intensity is approximately 32.000 Lux to grow well⁵.

According to Permadi, sunlight has an important role in the assimilation process that occurs in the leaves, then the results of the process will later be circulated throughout the plant parts used in the growth process⁴. Lack of sunlight can inhibit the photosynthesis process and also the growth of the plant. In addition, shortages during development can cause etiolation symptoms, namely the state of the sprout stem growing faster but brittle and having leaves with small, thin, and pale colors. Plants that experience a lack of sunlight intensity will cause the plants to be difficult to grow and experience changes every year.

Measurements of air humidity taken in Bantuil Village, Barito Kuala Regency have a range of 74-79%. From this it can be seen that in the research area the air humidity is sufficient to fulfill its growth needs. Water contained in the air plays a role in plant development, one of which is for the transpiration process. According to Rahayu, the need for rainfall in the inflorescence phase of the *Mangifera* species is 1000mm per year and 4-6 months of dry season per year, with suitable air humidity ranging from 79-80%⁵.

The measurement of soil moisture carried out in Bantuil Village, Barito Kuala Regency is 100%, which means that the soil moisture in the research area is very humid so that it can support the growth and development of plants in the area. This is because the soil in Bantuil Village is sometimes submerged in water which causes high humidity. According to Irwanto, the growth of a plant is caused by ideal soil moisture, which is between 40-80%⁷. In growth, if the humidity is high, the development and growth of seeds is also good, and vice versa, if the soil moisture is low, it can cause the seeds or plants to shrink and cannot develop properly.

The acidity measurement carried out in Bantuil Village, Barito Kuala Regency ranges from 5.6-6, which means that the research area has a fairly neutral soil pH value. According to Permadi, soil that has a good level of fertility has a deep profile that exceeds 150 cm with a loose crumbly soil structure, has a pH of 6-6.5⁴.

Conclusion

The diversity of *Mangifera* species found in Bantuil Village, Barito Kuala Regency amounted to 5 species, namely *Mangifera indica* L., *Mangifera odorata* (kweni), *Mangifera foetida* (hambawang), *Mangifera casturi* Kosterm (kasturi), and *Mangifera caesia* (binjai). *Mangifera indica* L. has 5 varieties, namely *hampalam*, *golek* mango, *manalagi* mango, *gadung* mango and *apple* mango.

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