An e-book project in adapting technology into science education.

The Story of Simpur

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The Story of Simpur

Adapted from Reza Azmi and J. Baret (2003).

Written by Steven Li Chen Yen.

Introduction

The Simpur or Dilleniaceae is named after the German botanist Johann Jacob Dillenius and can either be seen as a tree or a shrub or a climber or a herd. The leaves are generally spiral, without stipules; the blade of the leaves are simple, often with toothed margin. The veins can be seen as pinnate with the tertiary veins generally ladder-like while the stalks are often winged. The flowers of the Simpur are bisexual, often large and showy, either yellow or white in colour. The flowers of the Simpur are always radially symmetrical, generally with 5 sepals and petals. The sepals of the flower usually overlap, persisting and sometimes enlarging in the fruit of the Simpur. The stamens are usually high in number and the ovary seen as superior. There are many carpels with are free and often splitting in ripe fruit while the seeds of the Simpur are always large in numbers, generally small in size and with arils.

There are about 200 species, ten genera of Simpur or Dilleniaceae throughout the tropics. Only two genera and about 15 species are found in Brunei, specifically in lowland inland forests including mixed peat swamp and secondary forests up to sea level of 1000 m.

"the unique blossoming of the flower and the green color of its leaves symbolizes the development" of the country's "economy investment (from fruit) towards better economic growth (to flower)."

(Dr.s Idris M. Said, Forestry Department - Ministry of Industry and Primary Resources).

The Development Stages of the Simpur Flower and the Simpur Fruits

To put forward on the distinctive blooming stage of the Simpur flower, the yellowish green flower bud typically will cracked up its sepals which serve to protect and nourish during the budding stage at about 3 am. This exposes the large yellow corolla constituting of 5 petals altogether and each basically are about 10 cm in diameter along the axis (Dillenia suffruticosa), many stamens and about 4-20 carpels which are joined at the base. Pollination is particularly carried out by the bees (Xylocopa spp.) in an attempt to collect the pollen (this flower doesn't offer both nectar and scent to attract the insects. The Simpur petals started to fall-off later at the afternoon and apparently the protective sepals as well as the carpels are the merely components that represent the flower at this moment of time. The particular flower will only last for a day. The sepals, as naturally directed, will come together and fruit bud is implemented and this shifts its original downward flower bud position to a normal upward fruit bud position.

Almost every flower sets fruit and this stage of fruit development requires about 5 weeks to ripe. Like the flower bud, the fruit bud also opens up at 3 am and this exposes a pinkish star-shaped segment to reveal seeds covered in red arils which maybe up to 30 seeds in one fruit.

The fruit part of the Simpur plant is normally dispersed by the birds such as Yellow-vented Bulbuls (Pycnonotus goiavier) and Pink-necked Green Pigeons (Treron vernans), unlike the Simpur flower. The fruit will fall off after a day or two.

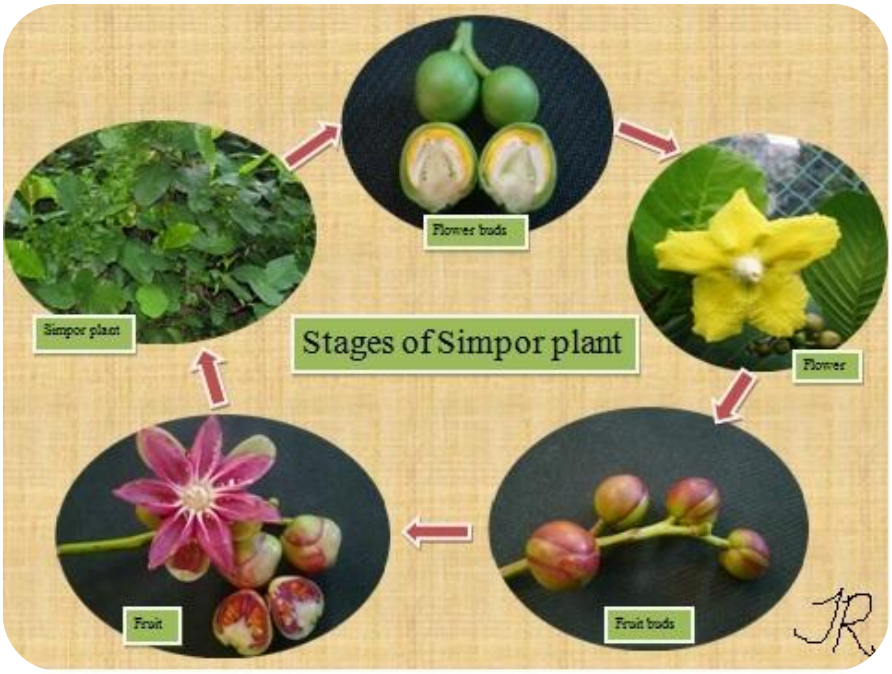
Flower bud

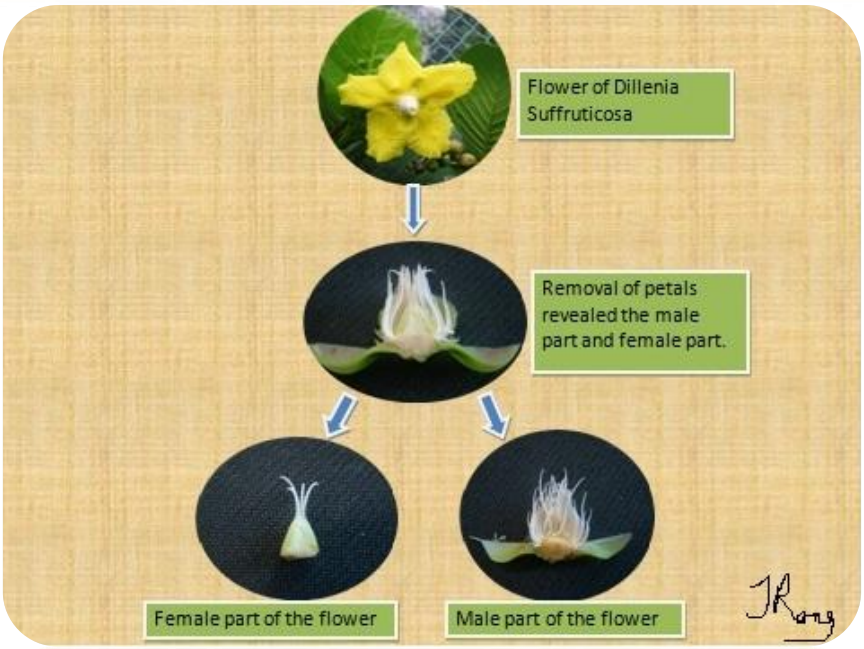
Fruit bud

Both the flowers and the fruits of the Simpur plant bloom from the different buds of the plant. In order to distinguish between the flowers from the fruit of the Simpur, the flower bud will face downward whereas the fruit bud will face upward. Another distinguishing factor would be that the flower bud appears greenish to yellowish in color whereas the fruit bud appears reddish in color.

Flower bud

Fruit bud





Photos above courtesy of Ryan Wu, http://zerranwu.blogspot.com/p/simpur-flower.html

Some of The Ecological Role of Simpur In Its Habitat

- The large leaves of the Simpur are used by tailorbirds to sew together into a pouch for their tiny nests.
- The large leaves of the Simpur holds shallow pools of rainwater in which becomes the breeding ground of mosquitos. Thus areas with high population of the Simpur plants are often mosquito- infested areas.
- It provides food and shelter for other plants and animals. It is among the few plants that can germinate and grow on white sands. As a pioneer species, it provides shade for other less hardy plants to establish themselves. The tiny bit red flesh (arils) surrounding the seeds are irresistible to birds, which quickly disperse the seeds.

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Some of the General Uses of Simpur

- The large leaves of the Simpur are used to wrap food such as tempeh (fermented soyabean cakes), nasi lemak and tapai (fermented rice).
- Can be rolled into shallow cones to enclose traditional "fast food" such as rojak.
- The mature or old leaves of some species contain a deposit of silica in their tissues and thus they were once used as sandpaper or used to smooth the surface of teeth after filling.

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- The presence of Simpur plant theoretically as well as practically suggests an underground water source due to its nature where it sends out deep tap roots to reach the underground water sources. Thus some people use the plant as a guide to decide where to dig a well.
- Traditional medicinal uses: Simpur is used to staunch bleeding wounds, and the fruit pulp may be used to wash the hair (Brunei).

How do we identify the different species of Dillenia (Simpur) in Brunei Darussalam?

Field Key to the Species of Dillenia

1. Large shrubs and low-branched trees: leaf stalk entirely clasping stem, with wings more or less continuous with blade base……..2
   Straight boled trees; Leaf stalk clasping less than two-thirds of twig, unwinged……3

2. Leaf stalk wings not continuous with balde, separated by a constriction.....**1. *Dillenia beccariana***
   Leaf stalk wings continuous with blade, without constrictions……..**8. *Dillenia suffruticosa***

3. Lead blade toothed in juveniles only; twigs and leaf stalk pink-to-rust-brown hairy……..4
   Not as above……..5

4. Twig and mature leaf blade below and stalk densely rush brown hairy; blade base rounded or heart-shaped; tertiary veins beneath prominently raised; petals yellow……..**7. *Dillenia reticulata***
   Parts pale pink-brown hairy, leaf undersurface sparsely so; blade base wedge-shaped; tertiary veins hardly raised beneath; flowers without petals……..**4. *Dillenia grandifolia***

5. Leaf blade margin entire; veins looping to form an intramarginal vein……..6
   Leaf blade margin wavy or veins extending to teeth along the margin……..7

6. Leaf blade to 12 X 6.5cm, obovate, small; veins 6-7 pairs, well spaced…….**6. *Dillenia pulchella***
   Leaf blade at least 15 X 7cm, ovate-elliptic; veins at least 10 pairs, dense……..**3. *Dillenia excelsa var.tomentella***

7. Leaf stalk with long silvery hairs within the groove, parts otherwise hairless; large tree with stilt roots or flying buttresses……**2. *Dillenia borneensis***
   Leaf stalk hairless or hairy all over……..8

8. Leaf blade with rounded or acute apex, drying dark red-brown beneath; large trees with flyging buttresses……..**4. *Dillenia grandifolia***
   Leaf blade acuminate, drying yellow- or grey-brown; unbuttressed trees……9

9. Leaf veins at least 25 pairs, dense; cultivated tree……..**5. Dillenia indica**
   Leaf veins at most 20 pairs; indigenous tree……..10

10. Leaf stalk hairless, veins at most 13 pairs……..**3. *Dillenia excelsa var excels***
    Leaf stalk hairy, veins at least 15 pairs……**9. *Dillenia sumatrana***

Species of Dillenia (Simpur) found in Brunei Darussalam

1. **Dillenia beccariana**
   Commonly known as Buan (Iban)

   How does the plant look like?
   Large shrub or small tree to 6 m. Young parts, leaf undersurface, and stalk wings sparsely short or silky hairy or hairless.

   How about the leaves?
   Leaf blade c. 30 X 12 cm, oblong to narrowly obovate, decurrent into the leaf stalk but for a narrow constriction at the blade base, apex rounded or acute; veins 20-30pairs, running to teeth at the margin; stalk 3-6 cm long, winged, clasping twig.

   How about the flowers and the fruits?
   Raceme to 60 cm long, with up to 20 showy yellow flowers c 6.5 cm diameter. Fruit dehiscent, pink.

Where can this species of Dillenia be found?

Borneo endemic. Locally common on disturbed clay slopes in the lower Temburong and Batu Apoi valleys, in the Ulu Tutong and at Tasik Merimbun.

2. **Dillenia borneensis**

Commonly known as Ubah rusa (Iban)

How does the plant look like?

Large stilt-rooted main canopy tree, to 40 m tall.

How about the leaves?

Leaf blade c. 30 X 15 cm, elliptic to obovate, drying chocolate-brown, with wedge-shaped base and acute apex; veins 25-35 pairs; stalk 4-9cm long, unwinged, hardly clasping twig, densely silky hairy putside and on young twig.

How about the flowers and the fruits?

Raceme to 10-flowered; flowers to 20cm diameter, huge, pale yellow. Fruit unknown.

Where can this species of Dillenia be found?

Borneo endemic. Rare in Brunei; collected on clay soils in mixed dipterocarp forest at 300 m in Temburong District. Recorded from ecological plots at Kuala Belalong.

3. **Dillenia excelsa**

Commonly known as Simpur laki (Brunei, Dusun), beringin (Iban)

How does the plant look like?

Small to medium sized unbuttressed main canopy tree, to 40 m tall, 80 cm diameter. Bark rusty-brown, becoming powdery flaky.

How about the leaves?

Leaf balde c. 20 X 8 cm, elliptic-oblong; base wedge shaped, asymmetric and often slightly decurrent on one side; apex shortly acuminate; veins 10-13 pairs; stalk 2-5cm long, unwinged, clasping c. 2/3 the twig.

How about the flowers and the fruits?

Raceme with up to 12 flowers; flowers to 10 cm diameter, showy yellow. Fruit dehiscent.

Photos above courtesy of Alice Lim, http://learningscienceeducation.blogspot.com

Where can this species of Dillenia be found?
Western Malesia including the Philippines. Throughout Brunei to 600 m, in mixed dipterocarp forests, especially in moist valleys and lower slopes. Many var. excels have been planted near the Brunei Arts and Crafts Centre, Bandar Seri Begawan.

Two varieties are recognized:
Var. excelsa. Small smooth-barked tree; Leaves hairless, margins more or less toothed, drying dark brown.
Var. tomentella (Martelli) Masamune. Large tree; leaves more or less densely grey-brown hairy below, margins entire; drying pale brown.

4. **Dillenia grandifolia**

How does the plant look like?
Large straight trunked canopy tree, to 40 m tall, 2 m diameter, with thin but prominent flying buttresses. Bark smooth, dark red-brown. Twigs, and leaf undersurface and stalk hairless or shortly sparsely hairy.

How about the leaves?
Leaves (mature trees) and their scars clustered towards twig endings; blade c. 10 x 6 cm, elliptic or obovate, thinly leathery, drying dark red- to chocolate-brown; margin wavy or slightly toothed, base wedge shaped, often asymmetric, apex acude or rounded; veins 18-28 pairs, slender but prominent beneath; tertiary veins hardly raised; stalk 4.5-7 cm long, deeply furrowed and clasping twig.

How about the flowers and the fruits?
Flower without petals; c. 2.5 cm diameter, greenish yellow. Fruit c. 2.5 cm diameter, spherical, not splitting.

Where can this species of Dillenia be found?
Peninsular Malaysia, Sumatra, Borneo, in lowland mized dipterocarp forest. Uncommon in Brunei, known from Ulu Ingei and Andulau Forest Reserve, Belait, and Kuala Belalong, Amo.

5. **Dillenia indica**

How does the plant look like?
Medium tree, to 30 m tall, with crooked trunk and distinct orange-brown bark. Parts hairless.

How about the leaves?
Leaf blade c. 20 x 10 cm, oblong to obovate, leathery, shiny, corrugated, drying yellow brown; margin prominently toothed, apex shortly acuminate, base narrowly wedge shaped; veins 25-50 pairs, prominent beneath; tertiaries hardly raised; stalk 2.5-7.5 cm long.

How about the flowers and the fruits?
Flowers very large, white, solitary. Fruit spherical, not splitting.

Photos above courtesy of Alice Lim, http://learningscienceeducation.blogspot.com

Where can this species of Dillenia be found?
From South Asia and Indo-Burma to Java and Borneo. Not native to Brunei, it is sometimes cultivated.

What can we use this species of Dillenia for?
An attractive ornamental tree with its huge and brilliant flowers, the fruit is sweet and used in curries and jellies.

6. **Dillenia pulchella**
Commonly known as Simpur paya (Brunei)

How does the plant look like?
Canopy tree to 40 m, 1 m diameter, with red-brown powdery flaky bark. Parts hairless.

Photos above courtesy of http://simpoh.blogspot.com/2007_05_01_archive.html

How about the leaves?
Leaf blade c. 8 x 4.5 cm, elliptic to obovate, entire, flat, thinly leathery, drying pinkish brown; base wedge shaped, apexrounded; veins 6-8 pairs, slender, slightly raised below; stalk 4-10 cm long.

How about the flowers and the fruits?
Flowers to 3 in an axil; corolla to 3.5 cm diameter, yellow. Fruit dehiscent.

Where can this species of Dillenia be found?
Sumatra, Peninsular Malaysia, Borneo. Locally in mixed peat swamp forest and swampy kerangas, in Brunei especially near the coast.

7. **Dillenia reticulata**
Commonly known as Simpur gajah (Brunei)

How does the plant look like?
Large, to 40 m tall, more or less deciduous, canopy tree, with prominent flying buttresses and stilt roots. Parts more or less densely pink to rust-brown hairy.

How about the leaves?
Leaves (mature tree) clustered towards ends of twigs, leaving clustered scars; blade c. 20 x 14 cm, elliptic-obovate, drying red-brown with felty undersurface and wrinkling; margin toothed, base broadly wedge shaped to heart-shaped, apex rounded or notched; veins 16-45 pairs, many, prominent below, with prominent ladder-like tertiaries; stalk 4-10 cm long.

How about the flowers and the fruits?
Raceme 5-10 flowered; flowers with c. 8 cm diameter, yellow corolla. Fruit indehiscent.

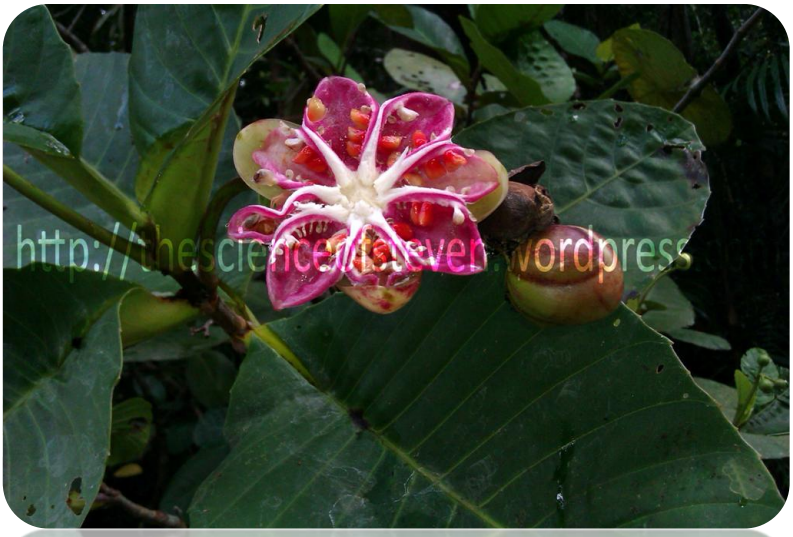
Where can this species of Dillenia be found?
Sumatra, Peninsular Malaysia, Borneo. Locally frequent on sandy soils in the floodplains of the streams within Andulau Forest Reserve in Brunei and in Ulu Belait.

8. **Dillenia suffruticosa**
Commonly known as Buan (Iban), tegering abai (Murut), dinging kala'o (Belait)

How does the plant look like?
Large shrub, occasionally to 10 m. Parts hairless.

How about the leaves?
Leaf blade c. 20 x 10 cm, elliptic-obovate, with toothed margin, leathery, drying grey-brown; base decurrent into stalk and continuing as a wing down to the twig; apex more or less rounded; veins 12-20 pairs, prominent below; tertiaries hardly raised; stalk to 6 cm long, clasping entire twig.

How about the flowers and the fruits?
Raceme to 10 flowered; flower with c. 10 cm diameter, large yellow corolla. Fruit dehiscent.



Where can this species of Dillenia be found?

Abundant on degraded land, often where recovering from fire; also common along river banks and other open places, especially downriver and on poor soils.

9. **Dillenia sumatrana**

Commonly known as Simpur laki (Brunei), peru (Iban), menterong

How does the plant look like?

Subcanopy or gap tree, to 20 m tall. Parts sparsely to densely grey-brown hairy.

How about the leaves?

Leaf blade c. 22 x 11 cm, narrowly elliptic-obovate, with toothed margin, thin, drying grey-brown; base more or less narrowly wedge-shaped, apex acuminate; veins 15-20 pairs, slender but prominent beneath; tertiary veins somewhat net-like, loose; stalk 1.5-5 cm.

How about the flowers and the fruits?
Raceme 2-3 flowered; corolla c. 6 cm diameter, yellow. Fruit indehiscent.

Where can this species of Dillenia be found?
Sumatra, Peninsular Malaysia, Borneo. Common in Brunei in lowland mixed dipterocapr forest on leached sandy and sandy clay soils; in Belait and Tutong Districts but so far not from Temburong.

What can this species of Dillenia be used for?
The wood is said to be hard and durable, and used for house construction.

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