

# Durian

“King of Fruits”



By

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## Introduction

- Durian is the Fruit of trees of the genus Durio
- Name “Durian” comes from the Malay word “Duri”, meaning "thorn“
- Durians are native to Southeastern Asia
- Durian is distinctive for its
  - Large size
  - Unique smell (odour)
  - Formidable thorn-covered husk

## Scientific Classification

- Kingdom: **Plantae**
- Division: **Magnoliophyta**
- Class: **Magnoliopsida**
- Order: **Malvales**
- Family: **Malvaceae (Bombacaceae)**
- Genus: **Durio**

## Scientific Classification

- There are 30 recognized *Durio* species
- Nine of them produce edible fruit
  1. *Durio zibethinus*
  2. *Durio dulcis*
  3. *Durio grandiflorus*
  4. *Durio graveolens*
  5. *Durio kutejensis*
  6. *Durio lowianus*
  7. *Durio macrantha*
  8. *Durio oxleyanus*
  9. *Durio testudinarum*
- *Durio zibethinus* is the only species available in the international market
- Other species are sold in locally

## Common Names in Languages

- **English:** Durian
- **Spanish:** Durián, Durio
- **Vietnam:** Sâu riêng
- **Philippines:** Dulian
- **Burma:** Du-yin
- **Cambodia:** Thu-réén
- **Laos:** Thourién
- **Thailand:** Thurian, Rian
- **Indonesia:** Duren, Ambetan, Kadu

## History

- Durian is a very ancient and primitive fruit
- Durian has been known and consumed in Southeastern Asia since prehistoric times
- Durian has only been known to the Western world for about 600 years
- Earliest known European reference on the Durian
  - Record of Nicolo Conti who traveled to Southeastern Asia in 15th century
  - Garcia de Orta described Durians in “Colóquios dos Simples e Drogas da India” in 1563
  - German botanist Georgius Everhardus Rumphius’ published “Herbarium Amboinense” In 1741
- Some botanists regard Durians as one of the first plants to rely on animals for dispersal of its seeds

## History

- Durian was introduced into Sri Lanka by the Portuguese in the 16th century
- Durian has been planted in the Americas in 1884, but confined to botanical gardens
- The Association of Durian Growers and Sellers was formed in 1959 to standardize quality and marketing practices



*Durio zibethinus*.  
Chromolithograph by  
Hoola Van Nooten, circa  
1863.

## Durian Flowers

- Durian flowers are strongly fragrant and having nectar
- 50-70 mm long and grow in clusters of 1 to 45 individual flowers per cluster
- Flower clusters hang from the main and smaller branches, or directly from the trunk of the tree.
- Period of 3 to 4 weeks of dry weather is needed to stimulate flowering
- It takes about one month for a durian flower to develop from first appearance as a tiny bud to an open blossom.
- Each flower has 5 sepals and 5 petals
- Colour of the flower matches the color of the edible pulp that will develop inside the fruit;
  - Yellowish petals produce yellow-fleshed Durians (the most common)
  - White or Reddish petals will produce white or reddish fleshed Durians

## Durian Flowers

- Durian flowers are normally open from around 3 p.m. to midnight
- Durian flowers are hermaphrodites, each having a stamen and pistil in the same flower.
- Self-pollination rarely happens because the pistil and the stamen do not appear at the same time.
- Durian flowers are primarily pollinated by Bats when they visited flowers for nectar
- No evidence for any durian pollination happens via the wind
- It has been demonstrated that durian fruit-set will greatly increase by human hand-pollination
- Usually only 1 or 2 durian fruit develop from each flower cluster



## Durian Leaf

- leaves are about 8 - 20 cm long and 2.5-7.5 cm wide
- Elliptic to oblong in shape
- Upper surface is shiny smooth, light or dark green
- Bottom surface is somewhat scaly, sometimes brown but more often with a golden shine.
- Leaves are folded at their mid-rib when they first appear, then stretch out as they mature.



## Durian Tree

- Durian propagated by seeds or grafting.
- Seeds must be planted fresh, as they lose viability quickly, especially if allowed to dry out.
- Trees started from seeds can eventually reach up to 50 m in height, with a trunk diameter of 120 cm
- Durian trees started from seed will have one primary taproot going directly down from the trunk and secondary roots growing out from it.



## Durian Tree

- Grafted trees are easy to spot, they have a distinctive characteristic shape like a large Christmas tree, and the branches grow out from the main trunk in every direction.
- Unless pruned otherwise, in older age grafted trees will eventually grow into 40 – 70% tall form as seedling trees
- If grown grafting, the tree will not have a primary tap root; instead it will have adventitious or secondary roots growing directly from the base of the trunk.



## Durian Tree

- Generally lives for 80 to 150 years, but capable of living for centuries
- Older trees die due to damage by wind, lightning, disease organisms, or humans
- Grafted trees begin to bear fruits in 4-5 years, while seedlings can take 15 years or more
- Trees are considered young from 6 to 15 yrs, middle-aged from 15-25 yrs and older after 25 yrs.
- Fruit production decreases in very old trees, but fruit quality tends to noticeably increase with age, hence fruits from older trees are expensive
- Fruit yield:
  - 10 to 40 fruits for the first year of fruiting
  - About 100 fruits for the sixth year of fruiting
  - Up to 200 fruits is common after the 10th year of fruiting
  - 10 to 15 tons fruits per hectare per year by 10 to 15 years after planting.

## Cultivars

- Durian trees have a great inherent tendency towards genetic diversity in every way
- This great tendency has contributed much to the durian's appeal, mystique, and success among humans
- Much of the fun and enjoyment for durian-lovers is the never-ending adventure of new variations of flavor, aroma, appearance, and texture
- Durian trees may vary in overall form, vigor and leaf size
- Durian flowers may vary in shape, size, color, fragrance, number of blossoms per cluster and number of resulting fruit
- Durian fruit may vary in size, shape; rind color, thickness, spikiness; aroma, texture and flavor
- Seed may vary in size, color, and number
- Over 300 varieties of durians are in Thailand, though only a half-dozen or so are grown commercially.
- In Malaysia, there are 200 distinct varieties have officially registered since the 1930's.

## Durian Fruit

- Durian fruit, matures in about 85 to 150 days after flower pollination
- Fruit is round to oblong in shape, greenish-or-yellowish-tan-brown in colour and covered with sharp spiny rind
- Rind is extremely tough and has evolved so as to be able to fall to the ground without major damage to the fruit, unless it lands on solid rock, from heights as much as 40 m
- Rind splits into five segments when ripe



## Durian Fruit

- Durian fruits' Weight commonly ranges from 2-5 kg, up to 8 kg is also possible.
- Thai varieties are generally the largest, as 200 mm long by 175 mm in diameter
- Fruits from Malaysia and most other regions are usually smaller and lighter
- The weight of the fruit and its spiky armor make a durian grove a hazardous place during ripening season, unless the fruits have all been pre-tied with strings or ropes to prevent their fall to the ground, or large safety nets positioned to catch them

## Durian Fruit

- Edible sections of Durian are technically called arils
- Aril is a fleshy outgrowth of the seed's own outer covering
- Aril starts to form 4 weeks after flower pollination; it starts as a white sheet then expands to cover the whole seed



## Durian Fruit

- Inside each fruit there are 5 compartments containing the arils and 1 to 7 seeds of 2-6 cm long with glossy, red-brown seedcoat
- The aril or pulp varies extensively between cultivars and different seedlings in aroma, flavor, texture, thickness, and color, usually cream yellow to deep orange, but also rarely in some varieties white and even bright red



## Durian Fruit

- Durians from trees aged 50, 60 years and more have enhanced qualities of flavor, aroma, and texture
- Fruits of older trees can be identified visually by having very wrinkled skin on the fruit sections



Fruit of young tree



Fruit of 38 yrs old tree

## Durian Fruit

- Durians are highly perishable. They are fully ripe 2 to 4 days after falling and lose eating quality in 5 or 6 days
- The fruit is attractive to a great variety of animals and insects as well as people, including monkeys, gibbons, orangutans, apes, birds, dogs, pigs, rhinoceros, bears, squirrels, tapirs, deer, elephants, tigers, and even the domestic cat.



## Odor/smell of Durian

- Sharp spiny rind, while the flesh within emits a strong, distinctive odor
- Some regard this as fragrant while others find it overpowering or offensive.
- This strong odor can be detected half a mile away
- Raw fruit is forbidden from some establishments because of its smell



Sign forbidding durians on Singapore's Mass Rapid Transit.

## Odor/smell of Durian

- Smell of Durian is a mixture of
  - Unwashed socks
  - Rotten fish
  - City dump on a hot summer's day
  - Carrion in custard
  - Decayed onion
  - Turpentine
  - Garlic
- Travel and food writer Richard Sterling says:  
*"... its odor is best described as pig-shit, turpentine and onions, garnished with a gym sock. It can be smelled from yards away..."*

## Taste of Durian

- Taste of the Durian is a mixture of

- Custard
- Almonds
- Cream cheese
- Sherry wine
- Ice cream spices
- Bananas

- The British naturalist Alfred Russel Wallace said:

*"A rich custard highly flavored with almonds gives the best general idea of it, but there are occasional wafts of flavor that call to mind cream-cheese, onion-sauce, sherry-wine, and other incongruous dishes. Then there is a rich glutinous smoothness in the pulp which nothing else possesses, but which adds to its delicacy."*

## Climate Condition

- **Soil:** It grows best in fertile, deep soils with abundant organic matter and a pH of 6-7
- **Temperature:** 25 -30 C; evenly distributed. The trees may survive occasional changes in temperature as low as 10° C and as high as 46 C.
- **Rainfall:** 1,500 - 2000 mm. In drier zones can produce good crops with appropriate irrigation
- Needs tropical warmth, abundant moisture, and sunshine to thrive
- If coconut can grow and bear well in some climate, except for seaside areas (durians are not salt-tolerant), durians may be possible too.
- **Latitude:** best within 15 degrees latitude of the equator. Also possible within 18-22
- **Altitude:** Durian produces best from sea level to about 213 m elevation, but is reported to fruit as high as 792 m in elevation. Upper elevation limit for growing durians
  - Sri Lanka - 600 m, Philippines - 700 m and Malaysia - 800 m

## Seasons

- In Sri Lanka, Durian generally blooms in March and April and the fruits mature in July and August
- In areas near the equator where no defined wet and dry seasons, like Malaysia and Sumatra, individual trees commonly bear fruit twice a year, with the peaks in June and December.
- In tropical areas with distinct wet and dry seasons, ex. India and eastern Java, flowering begins near the end of the dry season.
- In tropical areas farther than 10° north or south from the equator, flowering normally starts in the spring months, with an annual harvest in mid-summer to autumn.

## Durian Nutritional Characteristics

(average per 100 grams)

<b>Calories</b>	<b>134-153</b>	<b>Carotene (Vit. A)</b>	<b>20-30 IU</b>
<b>Moisture</b>	<b>58-70 g</b>	<b>Thiamin (Vit. B1)</b>	<b>0.20-0.28 mg</b>
<b>Protein</b>	<b>2.0-3.3 g</b>	<b>Riboflavin (Vit. B2)</b>	<b>0.10-0.28 mg</b>
<b>Carbohydrates</b>	<b>30.0-36.1 g</b>	<b>Niacin</b>	<b>0.68-1.1 mg</b>
<b>Fat</b>	<b>1.2-4.3 g</b>	<b>Vitamin C</b>	<b>23-62 mg</b>
<b>Calcium</b>	<b>7.4-18 mg</b>	<b>Vitamin E</b>	<b>"high"</b>
<b>Phosphorus</b>	<b>27-56 mg</b>	<b>Trace minerals</b>	<b>"many"</b>
<b>Iron</b>	<b>0.73-2.0 mg</b>	<b>Mana (intangible life energy)</b>	<b>"powerful"</b>

## Use of Durian

- Pulp is usually consumed fresh
- Durian is also used to flavor ice cream, cookies and candies
- Preserved by canning, freezing, drying, boiling with sugar, fermenting, or salting
- Durian is also used to prepare sauces and relishes
- Seeds are edible, eaten after boiling, frying or roasting
- Young shoots and unripe fruit are cooked and eaten as a vegetable
- The rinds can be dried and burned as fuel
- Food hung in the smoke gains a distinctive flavor
- Silk is sometimes bleached with the resulting ash in Southeast Asia
- Durian wood is suitable for light construction, door and window frames, wooden sandals, flooring, planking, plywood, sliced veneer and furniture.

## Medicinal Properties

- Parasitic worms are said to be expelled by eating durian
- Fevers are said to be reduced by drinking a tea of the leaves and roots, or applying durian leaf juice to the head
- Swellings and skin diseases are said to be healed by applying a tea of the leaves and fruits
- People with high blood pressure or pregnant women are traditionally advised not to consume durian
- Durian is not recommended for consuming with alcoholic beverages, as the combination of natural substances is a powerful producer of internal gas

## Durian Production

- Commercial production is mostly in Thailand, Malaysia, Indonesia, Philippines, Vietnam, Brunei, southern India and Northern Australia
- Relatively small numbers of the trees are found in Jamaica, Honduras, Puerto Rico, Trinidad, and Hawaii
- Thailand is the largest commercial producer of durians
  - Produced 927,194 tons in 1999, with approximately 137,649 hectares in cultivation
  - About half of this total comes from Chanthaburi province, 240 km east of Bangkok, which may be the durian capital of the world
  - Large and luscious Monthong variety is revered by many people as the best in the world.
  - Durian is not native to Thailand, but introduced only in the late 18th century A.D
- Malaysians disdain the flavor of Thai durians as "flat" and regard their own, smaller but more richly-flavored varieties as the best.

## How to select good Durians

- ASEAN Food Handling Bureau, Kuala Lumpur, Malaysia, lists 9 ways to detect the ripeness of a durian
  1. In many varieties, the tips of the spikes turn darker brown than the bases of the spikes
  2. Spike tips also become slightly elastic and more flexible
  3. Grooves between spikes expand and turn darker
  4. Depending on variety, the fruit stem may become either more stiff or more flexible than unripe fruits



## How to select good Durians

5. Abscission zone in the fruit stem just above the fruit tends to bulge
6. Sutures in the rind where the sections will split apart become more noticeable
7. When tapped fruit gives a hollow sound; when shaken, the best fruits have a sound of something moving inside, of fruit sections knocking shell
8. Sap from the fruit stem will be clear and sweet; in unripe fruits, it is thick, sticky, and not sweet
9. If a small "window" into the fruit is cut to check out the insides, the fragrance will be stronger and the pulp more colorful than unripe fruits

**Thank You**