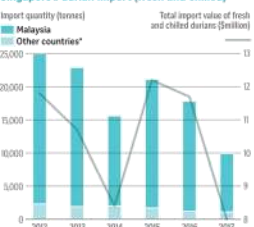


It is known that nectar bats help pollinate durian flowers but a recent pioneering field study by non-profit research group Rimba at Malaysia's Pulau Tioman confirms that the larger island flying fox, a fruit bat, is also an important pollinator. This discovery could aid the cause for the conservation of the flying foxes. A group of cancer scientists in Singapore published a paper in August documenting their success in sequencing the durian fruit's genome. The paper also said that the durian's sulfur-related genes could have evolved to attract bats and elephants. This knowledge could benefit growers in South-east Asia, where the durian is a major crop.

DURIANS AT A GLANCE

South-east Asia's indisputable crop of fruits is an economically important crop.

Singapore's durian import (fresh and chilled)



NOTE: *Thailand, the Philippines, Indonesia, etc

Last year's total
17,800 tonnes

93.3% of which are from Malaysia



Durian cultivation

• Number of varieties of tropical durians, with different prices, aromas, tastes and fruit textures
More than 200

• Top durian-producing countries
Thailand, Malaysia and Indonesia

• Top 3 countries that import durians to Singapore (2016 and 2017 to date)
Malaysia, Thailand and Philippines

*In terms of quantity of freshly-chilled durians

• In Malaysia (up to 2016)
Total area **66,000ha** Total production **302,000 tonnes**

China's booming durian market

• Retail price of Malaysia's Musang King
About RM150 per kg (\$55)

• Number of people who lined up to taste flavoured, whole-fruit samples of Malaysia's Musang King variety at a durian festival in Nanjing in southern China in November

About 165,000

• Malaysia's durian exports - frozen fruit and derivative products - to China



A matter of taste

Popular in...	Thailand
Malaysia	Sweeter cultivars with a mild odour
Fruits tend to be left to ripen in situ	Varieties can be harvested just before they ripen, ideal for overseas shipment
Ferment quickly after being harvested	

A durian vendor in a suburb in Pahang



HOW FLYING FOXES POLLINATE DURIAN FLOWERS



Big eyes
It relies on sight, not echolocation, to navigate.

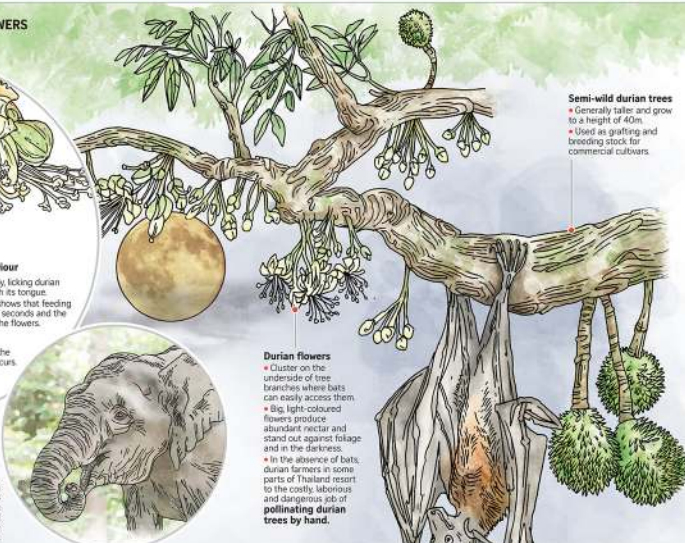
Pollen

• Pollen stuck to its fur gets transported to the flowers of other trees and cross-pollination occurs.
• Durian flowers pollinated by flying foxes in the study developed into healthy fruits.

Feeding behaviour

• It feeds solitary, licking durian flower nectar with its tongue.
• Video footage shows that feeding bouts average 27 seconds and the bats do not eat the flowers.

The durian's production of high levels of odour compounds may have been vital in attracting animals such as elephants and wild boars to eat the fruit and disperse the seeds in their droppings.



Semi-wild durian trees

• Generally taller and grow to a height of 40m.
• Used as grafting and breeding stock for commercial cultivars

Durian flowers

• Cluster on the underside of tree branches where bats can easily access them.
• Big, light-coloured flowers produce abundant nectar and stand out against foliage and in the darkness.
• In the absence of bats, durian farmers in some parts of Thailand resort to the costly, laborious and dangerous job of pollinating durian trees by hand.

BATS' OTHER ECOLOGICAL ROLES

Besides being a floral pollinator, here are some examples of the benefits that the much-maligned bats bring to ecosystems and humankind.

Seed dispersers

Frugivorous bats' habit of defaecating in flight helps disperse seeds to diverse habitats from forest to coast. One such example is the native lesser dog-faced fruit bat (right).



Pest controllers

Insectivorous bats act as biological agents in agriculture.

US\$3.7 billion a year (\$5 billion)
Estimated cost savings - to farmers in the US - related to pest control and pesticide use.

Nutrients contributor

Nitrogen and phosphate-rich bat waste, or guano, has been and is being harvested from caves to be used in agriculture as organic fertilisers.



Island flying fox (*Pteropus hypomelanus*)

• Average wingspan 1.2m, Weight: 0.5kg
• Named for its dog-like face and large ears and eyes
• It tends to feed at the upper canopy of trees.
• Biggest threats: habitat loss and being hunted as crop pest or for food and medicine
• Listed as endangered on the Malaysian Red List and populations are on the decline
• Almost half the fruit bat species of the genus *Pteropus* are now threatened with extinction

NOTE: *Aside from Rimba's report, in-depth studies are needed to ascertain the extent to which bat numbers affect durian quality and quantity.

UNRAVELLING THE DURIAN'S DNA

Scientists from the Humphrey Oei Institute of Cancer Research and Duke-NUS Medical School in Singapore have - for the first time in the world - decoded the durian's complete genetic map and in the process, thrown up some interesting facts.

A durian has about **46,000 genes** - double that of humans.



The durian and the cacao plant (above), whose seeds produce chocolate, shared a common ancestor 65 million years ago.

Durian (*Durio zibethus*)

• The only durian species sold commercially and a major South-east Asian food crop.
• The durian's sequenced genome can help growers cultivate fruits that are more disease-resistant, drought-tolerant, more flavourful - and even diabetic-friendly.

• Gene that regulates odour compounds that gives it its signature smell.
Methionine gamma lyases (MGL)

• Number of MGL copies that the durian plant has, compared with only one or two in other plants.

• **11 out of the 30** known durian species in South-east Asia - some of which are endangered - are edible.

DID YOU KNOW?

Research findings on durian benefits from various countries:

Flesh

• Higher level of antioxidants
• Elevated levels of potassium help reduce high blood pressure.

Skin

• Polysaccharide gel helps stimulate the immune systems to reduce cholesterol.
• Has analgesic and antibiotic properties that help to relieve coughs.

SHIFFING OUT A GOOD DURIAN

Best durians are oval or slightly oblong in shape.

Sniff along the seams or split lines of the durian but not at its base where the husk is the thickest.

