

Coconut

Coconut palm
Cocos nucifera



Coconut palm (*Cocos nucifera*)

Scientific classification

Kingdom: Plantae
Class: Monocots^[1]
Order: Arecales
Suborder: Commelinids
Family: Arecaceae

Subfamily:	Arecoideae
Tribe:	Cocoeae
Genus:	Cocos
Species:	C. nucifera
Binomial name	
Cocos nucifera L.	

Description.

Cocos nucifera is a large palm, growing up to 30 m (98 ft) tall, with pinnate leaves 4–6 m (13–20 ft) long, and pinnae 60–90 cm long; old leaves break away cleanly, leaving the trunk smooth. Coconuts are generally classified into two general types: tall and dwarf.^[6] On very fertile land, a tall coconut palm tree can yield up to 75 fruits per year, but more often yields less than 30, mainly due to poor cultural practices.^[7] In recent years, improvements in cultivation practices and breeding have produced coconut trees that can yield more.^{[8][9]}

Fruit

Botanically, the coconut fruit is a drupe, not a true nut.^[10] Like other fruits, it has three layers: the exocarp, mesocarp, and endocarp. The exocarp and mesocarp make up the "husk" of the coconut. Coconuts sold in the shops of nontropical countries often have had the exocarp (outermost layer) removed. The mesocarp is composed of a fiber, called coir, which has many traditional and commercial uses. The shell has three germination pores (stoma) or "eyes" that are clearly visible on its outside surface once the husk is removed.

A full-sized coconut weighs about 1.44 kg (3.2 lb). It takes around 6,000 full-grown coconuts to produce a tonne of copra.

Roots

Unlike some other plants, the palm tree has neither a tap root nor root hairs, but has a fibrous root system.

The coconut palm root system consists of an abundance of thin roots that grow outward from the plant near the surface. Only a few of the roots penetrate deep into the soil for stability. The type of root system is known as fibrous or adventitious, and is a characteristic of grass species. Other types of large trees produce a single downward-growing tap root with a number of feeder roots growing from it.

Coconut palms continue to produce roots from the base of the stem throughout its life. The number of roots produced depends on the age of the tree and the environment, with more than 3,600 roots possible on a tree that's 60 to 70 years old.

Roots are usually less than about 3 inches in diameter and uniformly thick from the tree trunk to the root tip.

Inflorescence

The palm produces both the female and male flowers on the same inflorescence; thus, the palm is monoecious. Other sources use the term polygamomonoecious. The female flower is much larger than the male flower. Flowering occurs continuously. Coconut palms are believed to be largely cross-pollinated, although some dwarf varieties are self-pollinating.

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Description[



Coconut flowers



A dehusked coconut shell from Côte d'Ivoire showing the face-like markings at the base



A cut coconut shell

One of the earliest mentions of the coconut dates back to the One Thousand and One Nights story of Sinbad the Sailor; he is known to have bought and sold coconuts during his fifth voyage. Tenga, its Malayalam name, was used in the detailed description of coconut found in Itinerario by Ludovico di Varthema published in 1510 and also in the later Hortus Indicus Malabaricus.^[16] Even earlier, it was called nuxindica, a name used by Marco Polo in 1280 while in Sumatra, taken from the Arabs who called it jawzhindī. Both names translate to "Indian nut".^[17] In the earliest description of the coconut palm known, given by Cosmos of Alexandria in his Topographia Christiana written about 545 AD, there is a reference to the argell tree and its drupe.^{[16][18]}

It is often cited that coconuts can travel 110 days, or 3000 miles, by sea and still be able to germinate.^[37] This figure has been questioned based on the extremely small sample size of the paper that makes this claim.

Natural habitat



Coconut germinating on Black Sand Beach, Island of Hawaii

The coconut palm thrives on sandy soils and is highly tolerant of salinity. It prefers areas with abundant sunlight and regular rainfall (1500 mm to 2500 mm annually), which makes colonizing shorelines of the tropics relatively straightforward.^[42] Coconuts also need high humidity (70–80%+) for optimum growth, which is why they are rarely seen in areas with low humidity, like the southeastern Mediterranean or Andalusia, even where temperatures are high enough (regularly above 24 °C or 75.2 °F).

Coconut palms require warm conditions for successful growth, and are intolerant of cold weather. Optimum growth is with a mean annual temperature of 27 °C (81 °F), and growth is reduced below 21 °C (70 °F). Some seasonal variation is tolerated, with good growth where mean summer temperatures are between 28 and 37 °C (82 and 99 °F), and survival as long as winter temperatures are above 4–12 °C (39–54 °F); they will survive brief drops to 0 °C (32 °F). Severe frost is usually fatal, although they have been known to recover from temperatures of –4 °C (25 °F).^[42] They may grow but not fruit properly in areas with insufficient warmth, such as Bermuda.

The conditions required for coconut trees to grow without any care are:

- Mean daily temperature above 12–13 °C (53.6–55.4 °F) every day of the year
- Mean annual rainfall above 1,000 mm (39.37 in)
- No or very little overhead canopy, since even small trees require direct sun

The main limiting factor for most locations which satisfy the rainfall and temperature requirements is canopy growth, except those locations near coastlines, where the sandy soil and salt spray limit the growth of most other trees.

Diseases[edit]

Main article: List of coconut palm diseases

Coconuts are susceptible to the phytoplasma disease lethal yellowing. One recently selected cultivar, the Maypan, has been bred for resistance to this disease.

Pests[edit]

The coconut palm is damaged by the larvae of many Lepidoptera (butterfly and moth) species which feed on it, including *Batrachedra* spp.: *B. arenosella*, *B. atriloqua* (feeds exclusively on *C. nucifera*), *B. mathesoni* (feeds exclusively on *C. nucifera*), and *B. nuciferae*.

Brontispalongissima (coconut leaf beetle) feeds on young leaves, and damages seedlings and mature coconut palms. In 2007, the Philippines imposed a quarantine in Metro Manila and 26 provinces to stop the spread of the pest and protect the \$800 million Philippine coconut industry.^[43]

The fruit may also be damaged by eriophyid coconut mites (*Eriophyesguerreronis*). This mite infests coconut plantations, and is devastating: it can destroy up to 90% of coconut production. The immature seeds are infested and desapped by larvae staying in the portion covered by the perianth of the immature seed; the seeds then drop off or survive deformed. Spraying with wetttable sulfur 0.4% or with neem-based pesticides can give some relief, but is cumbersome and labor-intensive.

In Kerala, the main coconut pests are the coconut mite, the rhinoceros beetle, the red palm weevil and the coconut leaf caterpillar. Research on this topic has as of 2009 produced no results, and researchers from the Kerala Agricultural

University and the Central Plantation Crop Research Institute, Kasaragode are still searching for a cure. The KrishiVigyan Kendra, Kannur under Kerala Agricultural University has developed an innovative extension approach called compact area group approach (CAGA) to combat coconut mites.

India[edit]



Coconuts being sold on a street in India

Coconut plucking in Kerala, India



Coconut trees in Komarapalayam, Tamil Nadu



Green coconut fruit strands on the tree are featured on each Maldivian rufiyaa banknote



Coconut trees are among the most common sights throughout Kerala

Culinary use



Green coconuts



The various parts of the coconut have a number of culinary uses. The seed provides oil for frying, cooking, and making margarine. The white, fleshy part of the seed, the coconut meat, is used fresh or dried in cooking, especially in

confections and desserts such as macaroons. Desiccated coconut or coconut milk made from it is frequently added to curries and other savory dishes. Coconut flour has also been developed for use in baking, to combat malnutrition.^[52] Coconut chips have been sold in the tourist regions of Hawaii and the Caribbean. Coconut butter is often used to describe solidified coconut oil, but has also been adopted as a name by certain specialty products made of coconut milk solids or puréed coconut meat and oil. Dried coconut is also used as the filling for many chocolate bars. Some dried coconut is purely coconut but others are manufactured with other ingredients, such as sugar, propylene glycol, salt, and sodium metabisulfite.

Main article: Coconut water

Coconut water serves as a suspension for the endosperm of the coconut during its nuclear phase of development. Later, the endosperm matures and deposits onto the coconut rind during the cellular phase. Coconut water contains sugar, dietary fiber, proteins, antioxidants, vitamins, and minerals, and provides an isotonic electrolyte balance. It is consumed as a refreshing drink throughout the humid tropics, and is gaining popularity as a sports drink. Mature fruits have significantly less liquid than young, immature coconuts, barring spoilage. Coconut water can be fermented to produce coconut vinegar.

Main article: Coconut oil

Another byproduct of the coconut is coconut oil. It is commonly used in cooking, especially for frying. It can be used in liquid form as would other vegetable oils, or in solid form as would butter or lard.