


# Ceratonia siliqua

carob alfarroba χαρουπιά, ξυλοκερατιά keçiboynuzu	
	
Illustration of components of the carob tree ( <i>Ceratonia siliqua</i> ).	
Scientific classification	
Kingdom:	Plantae
(unranked):	Angiosperms
(unranked):	Eudicots
(unranked):	Rosids
Order:	Fabales
Family:	Fabaceae
Genus:	<i>Ceratonia</i>
Species:	<i>C. siliqua</i>
Binomial name	
<i>Ceratonia siliqua</i> L.	

*Ceratonia siliqua*, commonly known as the **carob tree**, **St John's-bread**,<sup>[1]</sup> or **locust bean**<sup>[2]</sup> (not to be confused with the African locust bean) is a species of flowering evergreen shrub or tree in the pea family, Fabaceae. It is widely cultivated for its edible pods, and as an ornamental tree in gardens. The ripe, dried pod is often ground to carob powder which is used as a substitute for cocoa powder.

It is native to the Mediterranean region including Southern Europe, Northern Africa, the larger Mediterranean islands; to the Levant and Middle-East of Western Asia into Iran; and to the Canary Islands and Macaronesia.<sup>[3][4]</sup> The word *carat*, a unit of mass for gemstones and a unit of purity for gold alloys, was possibly derived from the Greek word *kerátion* literally meaning a small horn, and refers to the carob seed as a unit of weight.

## Morphology

The *Ceratonia siliqua* tree grows up to 15 metres (49 ft) tall. The crown is broad and semi-spherical, supported by a thick trunk with brown rough bark and sturdy branches. Leaves are 10 to 20 centimetres (3.9 to 7.9 in) long, alternate, pinnate, and may or may not have a terminal leaflet. It is frost-tolerant.

Most carob trees are dioecious, some are hermaphrodite. The male trees don't produce fruit.<sup>[5]</sup> The trees blossom in autumn. The flowers are small and numerous, spirally arranged along the inflorescence axis in catkin-like racemes borne on spurs from old wood and even on the trunk (cauliflory); they are pollinated by both wind and insects.

The fruit is a legume (also known less accurately as a pod), that can be elongated, compressed, straight or curved, and thickened at the sutures. The pods take a full year to develop and ripen. The ripe pods eventually fall to the ground and are eaten by various mammals, thereby dispersing the seed.

The seeds of *Ceratonia siliqua* contain leucodelphinidin, a colourless chemical compound.<sup>[6]</sup>



*Ceratonia siliqua* in native habitat (Sardinia, Italy).



*Ceratonia siliqua*, close-up of leaves.



*Ceratonia siliqua*, abaxial and adaxial surfaces of leaflet.



*Ceratonia siliqua*, close-up of female flower.



*Ceratonia siliqua*, male flowers, which emanate a strong cadaverine odor (Cyprus, October 2013).



*Ceratonia siliqua*, green fruit pods, 15 cm (6 inches) long, on tree.



*Ceratonia siliqua*, ripe fruit pods on tree.



*Ceratonia siliqua*, green and ripe pods.



*Ceratonia siliqua*, seeds and dry pods.



*Ceratonia siliqua* at the Shivta archaeological site, southern Israel.

## Habitat and ecology



Natural low branching form of tree in native habitat at WWF Oasis of Monte Arcosu, Sardinia, Italy.

The carob genus, *Ceratonia*, belongs to the Fabaceae (legume) family, and is believed to be an archaic remnant of a part of this family now generally considered extinct. It grows well in warm temperate and subtropical areas, and tolerates hot and humid coastal areas. As a xerophytic (drought-resistant) species, carob is well adapted to the ecological conditions of the Mediterranean region. Trees prefer well-drained loam and are intolerant of waterlogging, but the deep root systems can adapt to a wide variety of soil conditions and are fairly salt-tolerant.

While previously not believed to form nitrogen fixation nodules typical of the legume family, trees have been identified more recently with nodules containing

bacteria believed to be from the *Rhizobium* genus.

Although used extensively for agriculture, carob can still be found growing wild in eastern Mediterranean regions, and has become naturalized in the west. The carob tree is typical in the southern Portuguese region of the Algarve, where it has the name *alfarrobeira* (for the tree), and *alfarroba* (for the fruit), as well as in southern Spain (Spanish: *algarrobo*, *algarroba*), Catalonia and Valencia (Catalan: *garrofer*, *garrofa*), Malta (Maltese: *Harruba*), on the Italian islands of Sicily and Sardinia (Italian: *carrubo*, *carruba*), and in Southern Greece, Cyprus as well as many Greek islands such as Crete and Samos. The common Greek name is (Greek: χαρουπιά, charoupia), or (Greek: ξυλοκερατιά, ksilokeratia), meaning "wooden horn". In Turkey, it is known as "keçiboynuzu", meaning "goat's horn". In Israel it's called "Haroov" (חרוב), known as "life saving tree - kav kharoovin". The various trees known as *algarrobo* in Latin America (*Albizia saman* in Cuba and four species of *Prosopis* in Argentina and Paraguay) belong to a different subfamily, Mimosoideae.

## Etymology, history and cultural significance

The word carob comes from Middle French carobe, which was taken from Arabic خَرُوبٌ (kharrūb, "locust bean pod"), which derives from Akkadian language kharubu. *Ceratonia siliqua*, the scientific name of the carob tree, derives from the Greek kerátion (κεράτιον), "fruit of the carob" (from *keras* [κέρας] "horn"), and Latin *siliqua* "pod, carob." The term "carat", the unit by which precious metal and stone weight is measured, is also derived from the Greek word kerátion (κεράτιον), alluding to an ancient practice of weighing gold and gemstones against the seeds of the carob tree by people in the Middle East. The system was eventually standardized, and one carat was fixed at 0.2 grams.

In late Roman times, the pure gold coin known as the solidus weighed 24 carat seeds (about 4.5 grams). As a result, the carat also became a measure of purity for gold. Thus 24-carat gold means 100% pure, 12-carat gold means the alloy contains 50% gold, etc.

Subsistence on carob pods is mentioned in the Talmud: Berakhot reports that Rabbi Haninah subsisted on carob pods.<sup>[7]</sup> It is probably also mentioned in the New Testament, in which Matthew 3:4<sup>[8]</sup> reports that John the Baptist subsisted on "locusts and wild honey"; the Greek word translated "locusts" may refer to carob pods, rather than to grasshoppers. Again, in Luke 15:16, in the Parable of the Prodigal Son, when the Prodigal Son is in the field in spiritual and social poverty, he desires to eat the pods that he is feeding to the swine because he is suffering from starvation. The use of the carob during a famine is likely a result of the carob tree's resilience to the harsh climate and drought. During a famine, the swine were given carob pods so that they would not be a burden on the farmer's



limited resources. Use of the carob plant dates back to Mesopotamian culture (modern day Iraq). The carob pods were used to create juices, sweets, and were highly prized due to their many uses. The carob tree is mentioned frequently in texts dating back thousands of years, outlining its growth and cultivation in the Middle East and North Africa. The carob tree is mentioned with reverence in "The Epic of Gilgamesh", one of the earliest works of literature in existence.

The Jewish Talmud features a parable of altruism, commonly known as "Honi and the Carob Tree", which mentions that a carob tree takes 70 years to bear fruit; meaning that the planter will not benefit from his work, but works in the interest of future generations. In reality, the fruiting age of carob trees varies (see under Cultivation).

During the Second World War, it was common for the people of Malta to eat dried carob pods and prickly pears as a supplement to rationed food.

## Uses



Bottle of Maltese carob liqueur, north coast of Gozo Island in background (Malta, April 2009).

Carob consumed by humans is the dried (and sometimes roasted) pod, and not the 'nuts' or seeds. Carob is mildly sweet and is used in powdered, chip, or syrup form as an ingredient in cakes and cookies, and in chocolate substitute. Carob is rich in sugars - Sucrose =  $531 \text{ g} \pm 93 \text{ g/kg}$  dry weight for cultivated varieties and  $437 \pm 77 \text{ g/kg}$  in wild type varieties. Fructose and glucose levels do not differ between cultivated and wild type carob.<sup>[9]</sup>

Chocolate contains theobromine, which is poisonous to some mammals, but carob does not, and is used to make chocolate-flavored treats for dogs.<sup>[10]</sup>

Carob was eaten in Ancient Egypt. Carob juice drinks are traditionally drunk during the Islamic month of Ramadan. It was also a common sweetener and was used in the hieroglyph for "sweet" (*nedjem*). Dried carob fruit is traditionally eaten on the Jewish holiday of Tu B'Shvat. Also it is believed to be an aphrodisiac.

In Cyprus, carob syrup is known as Cyprus's black gold, and is widely exported.

In Malta, a syrup (*gulepp tal-harrub*) is made out of carob pods. This is a traditional medicine for coughs and sore throat. A traditional sweet, eaten during Lent and Good Friday, is also made from carob pods in Malta. However, carob pods were mainly used as animal fodder in the Maltese Islands, apart from times of famine or war when they formed part of the diet of many Maltese.

In the Iberian Peninsula, carob pods were used mainly as animal fodder, especially to feed donkeys.

Carob pods were an important source of sugar before sugarcane and sugar beets became widely available. Wikipedia:Citation needed

Carob syrup is also used in Crete, Greece as a natural sweetener and considered a natural source of calcium. It contains three times more calcium than milk. It is also rich in iron, phosphorus and natural fibers (Due to its strong taste, it can be found mixed with orange or chocolate).<sup>[11]</sup>

Carob pod meal is used as an energy-rich and palatable feed for livestock, particularly for ruminants, though its high tannin content may limit its use. Crushed pods may be used to make a beverage; compote, liqueur, and syrup are made from carob in Turkey, Malta, Portugal, Spain and Sicily. Several studies suggest that carob may aid in treating diarrhea in infants. In Libya, carob syrup (there called *rub*) is used as a complement to Asida. The so-called carob syrup made in Peru is actually from the fruit of the *Prosopis nigra* tree.

The seeds, also known as *locust beans* are the source of locust bean gum — a food thickening agent.

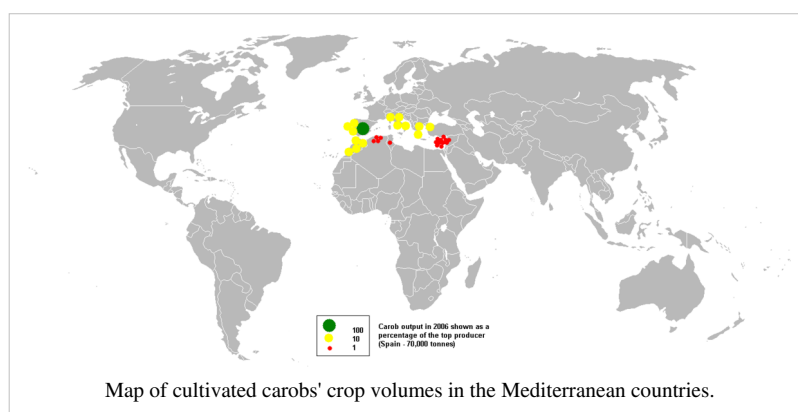
*Ceratonia siliqua* is widely cultivated in the horticultural nursery industry as an ornamental plant for planting in Mediterranean climate and other temperate regions around the world, as its popularity in California and Hawaii shows. The plant develops a sculpted trunk and ornamental tree form when 'limbed up' as it matures, otherwise it is used as a dense and large screening hedge. When not grown for legume harvests the plant is very drought tolerant and part of 'xeriscape' landscape design for gardens, parks, and public municipal and commercial landscapes.

## Cultivation

Cuttings taken from fruit-bearing carob trees may bear fruit in as few as three to four years, and seedlings grown in ideal conditions may bear fruit within six to eight years. Although it is native to moderately dry climates, two or three summers irrigation will greatly aid the development, hasten the fruiting, and increase the yield of a carob tree."

According to FAO, the top 5 carob producing countries are (in metric tonnes, 2010):<sup>[12]</sup>

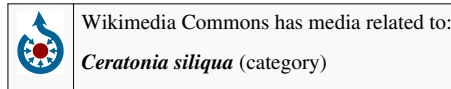
1.  Spain 48,000
2.  Italy 25,337
3.  Morocco 20,489
4.  Portugal 19,400
5.  Greece 13,300



## References

- [1] ITIS Report Page: *Ceratonia siliqua* ([http://www.itis.gov/servlet/SingleRpt/SingleRpt?search\\_topic=TSN&search\\_value=26531](http://www.itis.gov/servlet/SingleRpt/SingleRpt?search_topic=TSN&search_value=26531)) . accessed 5.11.2011
  - [2] REHM, S. ; ESPIG, G. "The cultivated plants of the tropics and subtropics : cultivation, economic value, utilization". - Weikersheim (DE) : Margraf, 1991. - viii,552 p. - p.220
  - [3] NPGS/GRIN - *Ceratonia siliqua* information (<http://www.ars-grin.gov/cgi-bin/npgs/html/taxon.pl?9918>) . accessed 5.11.2011
  - [4] <http://www.tropicos.org/Name/13028551> Tropicos.org. *Ceratonia siliqua* accessed 5.10.2011
  - [5] Sweet Crop Broadcast: 14/04/2013 1:11:16 PM Reporter: Prue Adams
  - [6] liberherbarum.com (<http://www.liberherbarum.com/Minor/UK/IN1764.htm>Leucodelphinidinon)
  - [7] "A Brief on Bokser - Forward.com" (<http://www.forward.com/articles/a-brief-on-bokser/>)
  - [8] <http://tools.wmflabs.org/bibleversefinder/?book=Matthew&verse=3:4&src=9>
  - [9] <http://www.sciencedirect.com/science/article/pii/S0308814605010824>
  - [10] Burg, Barbara. *Good Treats For Dogs Cookbook for Dogs: 50 Home-Cooked Treats for Special Occasions*. Quarry Books, 2007, p. 28
  - [11] [16] <http://cretansoil.com/en/natural-food-products/71-bioaroma-carob-syrup-ideal-for-sugar-replacement-osteoporosis-weight-loss-350-ml-1183fl-oz-5200120590282.html>
  - [12] <http://faostat.fao.org/site/567/DesktopDefault.aspx?PageID=567#ancor>
- Turnbull LA, Santamaria L, Martorell T, Rallo J, Hector A (September 2006). "Seed size variability: from carob to carats" (<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1686184>). *Biology Letters* **2** (3): 397–400. doi: 10.1098/rsbl.2006.0476 (<http://dx.doi.org/10.1098/rsbl.2006.0476>). PMC 1686184 (<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1686184>). PMID 17148413 (<http://www.ncbi.nlm.nih.gov/pubmed/17148413>). Lay summary (<http://www.newscientist.com/article/mg19025505.100>) — *New Scientist* (May 9, 2006).

## External links



### Tree and images

- Purdue Univ: Fruits of Warm Climates: Carob treatment (<http://www.hort.purdue.edu/newcrop/morton/carob.html>) - horticulture and cultivars, species and native habitat treatment,
- PFAF Plant Database: *Ceratonia siliqua* — Carob (<http://www.pfaf.org/user/Plant.aspx?LatinName=Ceratonia+siliqua>)
- U.C.CalPhotos: Carob —*Ceratonia siliqua* — Photo Gallery ([http://calphotos.berkeley.edu/cgi/img\\_query?query\\_src=photos\\_index&where-taxon=Ceratonia+siliqua](http://calphotos.berkeley.edu/cgi/img_query?query_src=photos_index&where-taxon=Ceratonia+siliqua))
- Encyclopedia.com: entry for Carob (<http://www.encyclopedia.com/topic/carob.aspx>)
- "Caroubier" ("The Carob Tree" - book) (<http://www.ginkgo.biloba.online.fr/caroubier/caroubier.pdf>) PDF (1.32 MB) (English)
- Leaves of carob tree, source of chocolate substitute, fight food-poisoning bacteria (<http://phys.org/news/2012-10-carob-tree-source-chocolate-substitute.html>)

### Crops and recipes

- Cooks.com: Carob recipes (<http://www.cooks.com/rec/search/0,1-0,carob,FF.html>)
- Egyptian-cuisine-recipes.com: "Recipe for the Egyptian Carob Drink" (<http://egyptian-cuisine-recipes.com/recipes/beverages/carob-locust-bean-drink-kharroob.html>)
- ([http://www.spiritoftrees.org/folktales/schram/honi\\_carob\\_tree.html](http://www.spiritoftrees.org/folktales/schram/honi_carob_tree.html))
- Landline.au: "Interview of Australian carob producers" (<http://www.abc.net.au/landline/content/2006/s1889655.htm>)

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