


# Jojoba

Jojoba	
	
A wild jojoba bush	
Scientific classification	
Kingdom:	Plantae
(unranked):	Angiosperms
(unranked):	Eudicots
(unranked):	Core eudicots
Order:	Caryophyllales
Family:	Simmondsiaceae van Tieghem ex Reveal & Hoogland
Genus:	<i>Simmondsia</i>
Species:	<i>S. chinensis</i>
Binomial name	
<i>Simmondsia chinensis</i> (Link) C. K. Schneid.	
Synonyms <sup>[1]</sup>	
<ul style="list-style-type: none"> <li>• <i>Buxus chinensis</i> Link</li> </ul>	

**Jojoba** <sup>i</sup><sup>hə</sup><sup>ˈ</sup><sup>h</sup><sup>oʊ</sup><sup>b</sup><sup>ə</sup>/ (*Simmondsia chinensis*) (also known as **goat nut**, **deer nut**, **pignut**, **wild hazel**, **quinine nut**, **coffeeberry**, and **gray box bush**) is a shrub which is native to the Sonoran, Mojave and Baja California deserts of Arizona, California, and Mexico and the southernmost portion of the California Floristic Province. It is the sole species of the family Simmondsiaceae, placed in the order Caryophyllales. Jojoba is grown commercially for its oil, a liquid wax ester, extracted from the seed. The plant has also been used to combat and prevent desertification in the Thar Desert in India.

## Description

Jojoba grows, to 1–2 meters (3.3–6.6 ft) tall, with a broad, dense crown, but there have been reports of plants as tall as 3 meters (9.8 ft). The leaves are opposite, oval in shape, 2–4 centimeters (0.79–1.57 in) long and 1.5–3 centimeters (0.59–1.18 in) broad, thick waxy glaucous gray-green in color. The flowers are small, greenish-yellow, with 5–6 sepals and no petals.

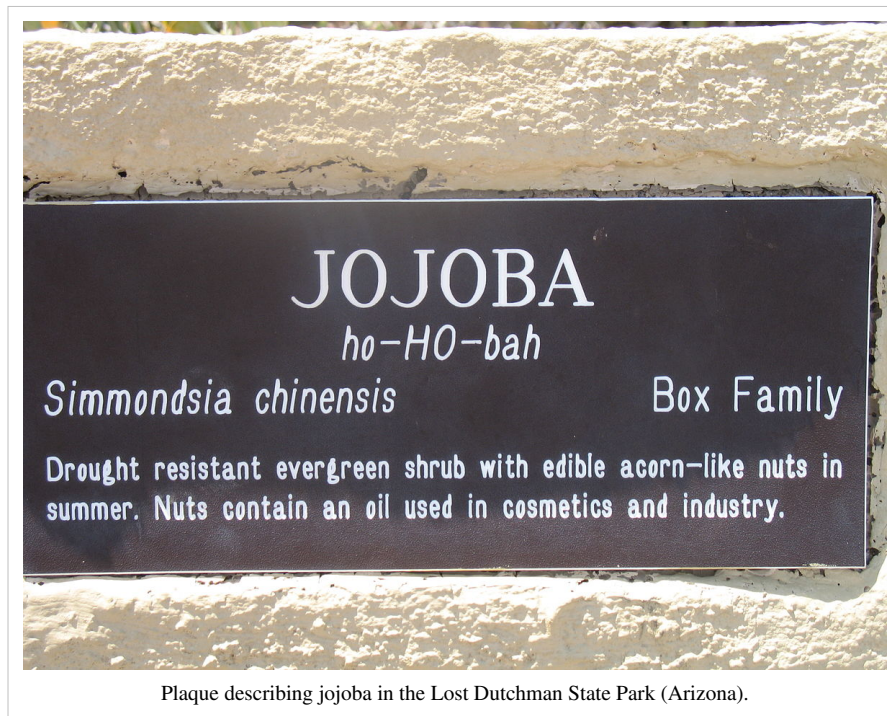
Jojoba foliage provides year-round food opportunity for many animals, including deer, javelina, bighorn sheep, and livestock. The nuts are eaten by squirrels, rabbits, other rodents, and larger birds. Only Bailey's Pocket Mouse, however, is known to be able to digest the wax found inside the jojoba nut.

In large quantities, the seed meal is toxic to many mammals, and the indigestible wax acts as a laxative in humans. The Seri, who utilize nearly every edible plant in their territory, do not regard the beans as real food and in the past ate it only in emergencies.

Despite its scientific name *Simmondsia chinensis*, Jojoba does not originate in China; the botanist Johann Link, originally named the species *Buxus chinensis*, after misreading a collection label "Calif" as "China".

It was the Native Americans who discovered the importance and versatility of jojoba. During the early eighteenth century Jesuit missionaries in Baja observed them heating jojoba seeds to soften them. They then used pestle and mortar to create a salve or buttery substance. The latter was applied to the skin and hair to heal and condition. Native Americans also used the salve to soften and preserve animal hides. Pregnant women ate jojoba seeds, believing they assisted during childbirth. Hunters and raiders munched jojoba on the trail to keep hunger at bay.

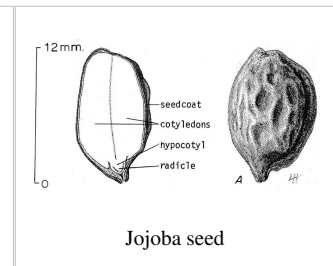
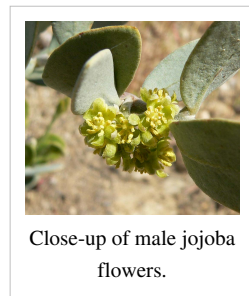
Jojoba was collected again in 1836 by Thomas Nuttall who described it as a new genus and species in 1844, naming it *Simmondsia californica*, but priority rules require that the original specific epithet be used. The common name should also not be confused with the similar-sounding Jujube (*Ziziphus zizyphus*), an unrelated plant. Wikipedia:Citation needed



Plaque describing jojoba in the Lost Dutchman State Park (Arizona).

## Reproduction

Each plant is single-sex, either male or female, with hermaphrodites being extremely rare. The fruit is an acorn-shaped ovoid, three-angled capsule 1–2 centimeters (0.39–0.79 in) long, partly enclosed at the base by the sepals. The mature seed is a hard oval, dark brown in color and contains an oil (liquid wax) content of approximately 54%. An average-size bush produces 1 kilogram (2.2 lb) of pollen, to which few humans are allergic. The female plants produce seed from flowers pollinated by the male plants. Jojoba leaves have an aerodynamic shape, creating a spiral effect, which brings wind-born pollen from the male flower to the female flower. In the Northern Hemisphere, pollination occurs during February and March. In the Southern Hemisphere, pollination occurs during August and September. The haploid number of jojoba is 13. Somatic cells of jojoba are tetraploid, the number of chromosomes is  $2n = 4x = 52$ .



## Origin

Jojoba is endemic to Northern America and occupies an area of approximately 260,000 square kilometers (100,000 sq mi) between latitudes 25° and 31° North and between longitudes 109° and 117° West, which is approximately the area covered by the Sonoran Desert.

## Etymology

The name "jojoba" originated from O'odham Hohowi. The O'odham people, from the Sonoran Desert in the southwestern United States, treated burns with an antioxidant salve made from a paste of the jojoba nut.

## Cultivation and uses

Jojoba is grown for the liquid wax (commonly called jojoba oil) in its seeds.<sup>[2]</sup> This oil is rare in that it's an extremely long (C36–C46) straight-chain wax ester and not a triglyceride, making jojoba and its derivative jojoba esters more similar to human sebum and whale oil than to traditional vegetable oils.

Jojoba oil is interesting for the industry because it is odorless and it has a viscosity which is temperature-independent. Applications vary from engine lubricating oil to cooking oil. Jojoba wax is used predominantly for pharmaceutical compounds, specially for skin products. After polymerization factice can be used for rubber production. The use as biodiesel fuel is becoming more and more important.<sup>[3]</sup>

The jojoba plant has also gained attention in the discussion about renewable energy, in particular, biofuels. Jojoba oil consists of long straight monoesters of 22 to 44 carbon atoms (as opposed to most vegetable oils which consist of triglycerides), which makes it comparable to diesel in respects of energy density. The pretreatment of jojoba oil for the use of biofuel is simpler compared to that of other mineral and bio-oils and it is expected that combustion of jojoba oil leads to smaller NO<sub>x</sub>-emissions compared to diesel and doesn't lead to SO<sub>x</sub> emissions at all.

Light and coarse textured soils are preferred by Jojoba. Good drainage and water penetration is necessary. It tolerates salinity and poor-nutrient soils. pH should be between 5 and 8.<sup>[4]</sup> High temperatures are tolerated by Jojoba but frost could damage or kill plants.<sup>[5]</sup> Requirements are poor because Jojoba plants don't need an intensive cultivation. Weed problems only occur first two years after planting and there is little damage by insects. Supplemental irrigation could maximize production if there is not enough rainfall of 400 mm. There is no need for high fertilisation but specially in the first year nitrogen increases growth.<sup>[6]</sup> Jojoba is normally harvested by hand because not all seeds do mature in the same time. Yield is around 3,5 t/ha depending from the age of plantation.

Plantations of jojoba have been established in a number of desert and semi-desert areas, predominantly in Argentina, Australia, Israel, Mexico, Peru and the United States. It is currently the Sonoran Desert's second most economically valuable native plant (overshadowed only by the *Washingtonia* palms used in horticulture).

Selective breeding is developing plants that produce more beans with higher wax content, as well as other characteristics that will facilitate harvesting.

Its ability to withstand high salinity (up to 12 dS m<sup>-1</sup> at pH 9) and the high value of jojoba products make jojoba an interesting plant for the use of desertification control, for example in India.



Jojoba (*Simmondsia chinensis*) oil in a clear glass vial



Wild jojoba seed market on the San Carlos Apache Indian Reservation in Arizona

## References

- [1] Tropicos (<http://tropicos.org/Name/4900022>)
- [2] IENICA "Jojoba" (<http://www.ienica.net/crops/Jojoba.pdf>) Retrieved on 2011-02-16.
- [3] Lieberei, N.(1979). Nutzpflanzen, *UTB*, Stuttgart, 1979, p 399
- [4] Yermanos, D. M.(1979). Jojoba – a crop whose time has come, *California Agriculture*
- [5] Borlaug, N.(1985), Jojoba. New Crop for Arid Lands, New Raw Material for Industry, *National Academy Press*
- [6] Nelson, M.(2001), Nitrogen fertilization effects on jojoba seed production, *Industrial Crops and Products*, 13, 2001, p 145-154

## External links



Wikimedia Commons has media related to *Simmondsia chinensis*.

- "Glossary" ([http://www.ijec.net/ijec\\_glossary.html](http://www.ijec.net/ijec_glossary.html)). International Jojoba Export Council.
- Selected Families of Angiosperms: Rosidae (<http://www.life.umd.edu/emeritus/reveal/pbio/pb450/rosi17.html>)—An explanation of the scientific name
- Jojoba oil as biodiesel (<http://www.newscientist.com/article/dn3464-jojoba-oil-could-fuel-cars-and-trucks.html>)
- Alternative Field Crops Manual (<http://www.hort.purdue.edu/newcrop/afcm/jojoba.html>)
- USDA Plants Profile: *Simmondsia chinensis* (<http://plants.usda.gov/java/profile?symbol=SICH>)
- Howser, Huell (January 14, 2009). "Jojoba – California's Gold (11014)" (<http://blogs.chapman.edu/huell-howser-archives/2009/01/14/jojoba-californias-gold-11014/>). *California's Gold*. Chapman University Huell Howser Archive.

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