

Benefits of Olive

- ❖ It is rich in vitamin A and E and polyphenols.
- ❖ Hydrates and nourishes the skin of the face.
- ❖ It has strong antioxidant properties and protects skin and hair from free radicals.
- ❖ Helps rebuild the skin and increases its shine.
- ❖ Increases skin elasticity.
- ❖ It has anti-inflammatory and antimicrobial properties.



(From Wikipedia, the free encyclopedia)
<http://en.wikipedia.org/wiki/Olive>

The **olive** (ⁱ/ˈɒliv/ or ⁱ/ˈɑːləv/, *Olea europaea*, meaning "Oil from/of Europe") is a [species](#) of small [tree](#) in the [family](#) [Oleaceae](#), much of [Africa](#), the [Mediterranean Basin](#) from [Portugal](#) to [Turkey](#), the [Arabian Peninsula](#), and southern [Asia](#) as far east as [China](#), plus the [Canary Islands](#), [Mauritius](#) and [Réunion](#). The species is cultivated in many places and considered naturalized in [France](#), [Corsica](#), [Crimea](#), [Egypt](#), [Iran](#), [Iraq](#), [Syria](#), [Java](#), [Norfolk Island](#), [California](#) and [Bermuda](#).^{[1][2]}

Its fruit, also called the olive, is of major agricultural importance in the Mediterranean region as the source of [olive oil](#). The tree and its fruit give its name to the plant family, which also includes species such as [lilacs](#), [jasmine](#), [Forsythia](#) and the true ash trees ([Fraxinus](#)). The word derives from [Latin](#) *ōlīva* ("olive fruit", "olive tree"; "olive oil" is *ōlĕum*)^[3] which is cognate with the [Greek](#) *ἐλαία* (*elaía*, "olive fruit", "olive tree") and *ἐλαίον* (*elaion*, "olive oil").^{[4][5]} The oldest attested forms of the latter two words in Greek are respectively the [Mycenaean](#), *e-ra-wa*, and, *e-ra-wo* or *e-rai-wo*, written in the [Linear B](#) syllabic script.^{[6][7]} The word "oil" in multiple languages ultimately derives from the name of this tree and its fruit.

Description



19th century illustration

The olive tree, *Olea europaea*, is an [evergreen](#) tree or [shrub](#) native to the [Mediterranean](#), [Asia](#) and [Africa](#). It is short and squat, and rarely exceeds 8–15 m (26–49 ft) in height. However, the *Pisciottana*, a unique variety comprising 40,000 trees found only in the area around [Pisciotta](#) in the [Campania](#) region of southern [Italy](#) often exceeds this, with correspondingly large trunk diameters. The silvery green [leaves](#) are oblong, measuring 4–10 cm (1.6–3.9 in) long and 1–3 cm (0.39–1.18 in) wide. The trunk is typically gnarled and twisted.

The small white, feathery [flowers](#), with ten-cleft [calyx](#) and [corolla](#), two [stamens](#) and bifid [stigma](#), are borne generally on the previous year's wood, in [racemes](#) springing from the [axils](#) of the leaves.

The [fruit](#) is a small [drupe](#) 1–2.5 cm (0.39–0.98 in) long, thinner-fleshed and smaller in wild plants than in orchard cultivars. Olives are harvested in the green to purple stage. Canned black olives may contain chemicals (usually [ferrous sulfate](#)) that artificially turn them black. *Olea europaea* contains a seed commonly referred to in American English as a pit or a rock, and in British English as a stone.

Taxonomy

There are six natural subspecies of *Olea europaea* distributed over a wide range.^{[8][9]}

- *Olea europaea* subsp. *europaea* (Mediterranean Basin)
- [Olea europaea subsp. cuspidata](#) (from South Africa throughout East Africa, Arabia to South West China)
- *Olea europaea* subsp. *guanchica* ([Canaries](#))
- *Olea europaea* subsp. *cerasiformis* ([Madeira](#))
- *Olea europaea* subsp. *maroccana* [Morocco](#)
- *Olea europaea* subsp. *laperrinei* ([Algeria](#), [Sudan](#), [Niger](#))

The subspecies *maroccana* and *cerasiformis* are respectively [hexaploid](#) and [tetraploid](#).^[10]

Wild growing forms of the olive are sometimes treated as the species [Olea oleaster](#).

Cultivars

Main article: [List of olive cultivars](#)

There are hundreds of [cultivars](#) of the olive tree (*Olea europaea*).^{[11][12]} An olive's cultivar has a significant impact on its color, size, shape, and growth characteristics, as well as the qualities of olive oil.^[11] Olive cultivars may be used primarily for oil, eating, or both. Olives for consumption are generally referred to as "table olives".^[13]

Since many olive cultivars are [self-sterile](#) or nearly so, they are generally planted in pairs with a single primary cultivar and a secondary cultivar selected for its ability to fertilize the primary one. In recent times, efforts have been directed at producing hybrid cultivars with qualities such as resistance to disease, quick growth and larger or more consistent crops.

History

Prehistory

The edible olive has been cultivated for at least 5,000 to 6,000 years,^[14] with the most ancient evidence of olive cultivation having been found in Syria, Israel and Crete.^[15] The olive tree is native to the Mediterranean region and Western Asia, and spread to nearby countries from there.

The immediate ancestry of the cultivated olive is unknown. It is assumed^[by whom?] that *Olea europaea* may have arisen from *O. chrysophylla* in northern tropical Africa and that it was introduced into the countries of the [Mediterranean Basin](#) via [Egypt](#) and then [Crete](#) or the [Levant](#), [Syria](#), [Tunisia](#) and [Asia Minor](#).^[citation needed] Fossil [Olea](#) pollen has been found in [Macedonia](#), [Greece](#), and other places around the Mediterranean, indicating that this genus is an original element of the Mediterranean flora. Fossilized leaves of *Olea* were found in the [palaeosols](#) of the volcanic Greek island of [Santorini \(Thera\)](#) and were dated about 37,000 [BP](#). Imprints of larvae of

olive whitefly *Aleurolobus (Aleurodes) olivinus* were found on the leaves. The same insect is commonly found today on olive leaves, showing that the plant-animal co-evolutionary relations have not changed since that time.^[16]

As far back as 3000 BC, olives were grown commercially in [Crete](#); they may have been the source of the wealth of the [Minoan civilization](#).^[17]

Americas, Japan

Olives are not native to the [Americas](#). The Spanish colonists brought the olive to the New World where its cultivation prospered in present-day [Peru](#) and [Chile](#). The first precious seedlings from Spain were planted in [Lima](#) by Antonio de Rivera in 1560. Olive tree cultivation quickly spread along the valleys of South America's dry Pacific coast where the climate was similar to the Mediterranean.^[18] The Spanish missionaries established the tree in the 18th century in [California](#). It was first cultivated at [Mission San Diego de Alcalá](#) in 1769 or later around 1795. Orchards were started at other missions but in 1838 an inspection found only two olive orchards in California. Oil tree cultivation gradually became a highly successful commercial venture from the 1860s onwards.^[19] In [Japan](#) the first successful planting of olive trees happened in 1908 on [Shodo Island](#) which became the cradle of olive cultivation.^[20] It is estimated that there are about 865 million olive trees in the world today (as of 2005), and the vast majority of these are found in Mediterranean countries, although traditionally marginal areas account for no more than 25% of olive planted area and 10% of oil production.^[21]

Symbolic connotations

See also: [Peace symbols](#)

Olive oil has long been considered sacred. The [olive branch](#) was often a symbol of abundance, glory and peace. The leafy branches of the olive tree were ritually offered to deities and powerful figures as emblems of benediction and purification, and they were used to crown the victors of friendly games and bloody wars. Today, olive oil is still used in many religious ceremonies. Over the years, the olive has been the symbol of peace, wisdom, glory, fertility, power and purity.

Ancient Egypt

Leafy branches of the olive tree were found in [Tutankhamun](#)'s tomb.

Ancient Israel and Hebrew Bible

The olive was one of the main elements in [ancient Israelite cuisine](#). Olive oil was used for not only food and cooking, but also lighting, sacrificial offerings, ointment, and [anointment](#) for priestly or royal office.^[22]

The olive tree is one of the first plants mentioned in the [Hebrew Bible](#) and in the Christian [Old Testament](#), and one of the most significant. It was an olive leaf that a dove brought back to [Noah](#)

to demonstrate that the flood was over ([Book of Genesis](#), 8:11). The olive is listed in [Deuteronomy](#), 8:8 as one of the [seven species](#) that are noteworthy products of the [Land of Israel](#).^[23]

Ancient Greece

The [ancient Greeks](#) used to smear olive oil on their bodies and hair as a matter of grooming and good health.

Olive oil was used to anoint kings and athletes in [ancient Greece](#). It was burnt in the sacred lamps of temples as well as being the "eternal flame" of the original Olympic Games. Victors in these games were crowned with its leaves.

In Homer's *Odyssey*, [Odysseus](#) crawls beneath two shoots of olive that grow from a single stock,^[24] and in the *Iliad*, (XVII.53ff) is a metaphoric description of a lone olive tree in the mountains, by a spring; the Greeks observed that the olive rarely thrives at a distance from the sea, which in Greece invariably means up mountain slopes. Greek myth attributed to the primordial [culture-hero](#) [Aristaeus](#) the understanding of olive husbandry, along with cheese-making and bee-keeping.^[25] Olive was one of the woods used to fashion the most primitive Greek [cult figures](#), called [xoana](#), referring to their wooden material; they were reverently preserved for centuries.^[26] It was purely a matter of local pride that the Athenians claimed that the olive grew first in Athens.^[27] In an archaic Athenian [foundation myth](#), [Athena](#) won the patronship of [Attica](#) from [Poseidon](#) with the gift of the olive. Though, according to the 4th-century BC father of botany, [Theophrastus](#), olive trees ordinarily attained an age of about 200 years,^[28] he mentions that the very olive tree of Athena still grew on the [Acropolis](#); it was still to be seen there in the 2nd century AD,^[29] and when [Pausanias](#) was shown it, c. 170 AD, he reported "Legend also says that when the Persians fired Athens the olive was burnt down, but on the very day it was burnt it grew again to the height of two [cubits](#)."^[30] Indeed, olive suckers sprout readily from the stump, and the great age of some existing olive trees shows that it was perfectly possible that the olive tree of the Acropolis dated to the [Bronze Age](#). The olive was sacred to Athena and appeared on the Athenian coinage.

[Theophrastus](#), in *On the Nature of Plants*, does not give as systematic and detailed an account of olive husbandry as he does of the [vine](#), but he makes clear (in 1.16.10) that the cultivated olive must be vegetatively propagated; indeed, the pits give rise to thorny, wild-type olives, spread far and wide by birds. Theophrastus reports how the bearing olive can be grafted on the wild olive, for which the Greeks had a separate name, *kotinos*.^[31]

Ancient Rome

According to [Pliny the Elder](#) a vine, a fig and an olive tree grew in the middle of the [Roman Forum](#), the latter was planted to provide shade (the garden plot was recreated in the 20th century).^[32] The Roman poet [Horace](#) mentions it in reference to his own diet, which he describes as very simple: "As for me, olives, [endives](#), and smooth [mallows](#) provide sustenance."^[33] [Lord Monboddo](#) comments on the olive in 1779 as one of the foods preferred by the ancients and as one of the most perfect foods.^[34]



Storing olives on [Dere Street](#); [Tacuinum Sanitatis](#), 14th century,

[Vitruvius](#) describes of the use of charred olive wood in tying together walls and foundations in his [De Architectura](#):

The thickness of the wall should, in my opinion, be such that armed men meeting on top of it may pass one another without interference. In the thickness there should be set a very close succession of ties made of charred olive wood, binding the two faces of the wall together like pins, to give it lasting endurance. For that is a material which neither decay, nor the weather, nor time can harm, but even though buried in the earth or set in the water it keeps sound and useful forever. And so not only city walls but substructures in general and all walls that require a thickness like that of a city wall, will be long in falling to decay if tied in this manner.^[35]

New Testament

The [Mount of Olives](#) east of [Jerusalem](#) is mentioned several times in the [New Testament](#). The Allegory of the Olive Tree in St. Paul's [Epistle to the Romans](#) (which reappears in greatly expanded form in the [Book of Jacob](#) in the Book of Mormon) refers to the scattering and gathering of Israel. It compares the [Israelites](#) and gentiles to tame and wild olive trees. The olive tree itself, as well as olive oil and olives, play an important role in the Bible.^[36]

Islam

The olive tree and olive oil are mentioned seven times in the [Quran](#),^[37] and the olive is praised as a precious fruit. Most notably, it is mentioned in one of the most famous verses of the Quran, [Ayat an-Nur](#): "Allah is the Light of the heavens and the earth. The metaphor of His Light is that of a niche in which is a lamp, the lamp is inside a glass, the glass is like a brilliant star. (This lamp is) lit from a blessed tree, an olive neither of the east nor of the west, its oil almost giving off light even though no fire touches it. Light upon Light. Allah guides to His Light whoever He wills and Allah makes metaphors for mankind and Allah has knowledge of all things." ([Quran](#),

24:35). Olive tree and olive-oil health benefits have been propounded in Prophetic medicine. [Muhammad](#) is reported to have said: "Take oil of olive and massage with it – it is a blessed tree" ([Sunan al-Darimi](#), 69:103).

Olives are substitutes for dates (if not available) during [Ramadan](#) fasting, and olive tree leaves are used as incense in some [Muslim Mediterranean](#) countries.^[38]

Uses

See also: [Olive oil](#)

The olive tree, *Olea europaea*, has been cultivated for olive oil, fine wood, [olive leaf](#), and the olive fruit. 90% of all harvested olives are turned in to oil, while about 10% are used as table olives.^[11]

Table Olives

Table olives are classified by the IOC into 3 groups according to the degree of ripeness achieved before harvesting.^[39]

- 1. Green Olives.** Picked when they have obtained full size, but before the ripening cycle has begun. Usually shades of green to yellow.
- 2. Semi-ripe or Turning Colour Olives.** Picked at the beginning of the ripening cycle, when the colour has begun to change from green to multi-colour shades of red to brown. Only the skin is coloured as the flesh of the fruit lacks pigmentation at this stage, unlike that of ripe olives.
- 3. Black Olives or Ripe Olives.** Picked at full maturity when fully ripe. Found in assorted shades of purple to brown to black.^[40]

Traditional fermentation and curing



An olive vat room used for curing.



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Raw or fresh olives are naturally very bitter; to make them palatable olives must be cured and [fermented](#), to remove [oleuropein](#), a bitter phenolic compound that can reach levels of 14% of dry matter in young olives.^[41] In addition to oleuropein, other phenolic compounds render freshly picked olives unpalatable and must also be removed or lowered in quantity through curing and fermentation. Generally speaking, phenolics reach their peak in young fruit and are converted as the fruit matures.^[42] (One exception is the [throubes olive](#), which can be eaten fresh.)^[43] Once ripening occurs the levels of phenolics sharply decline through their conversion to other organic products which renders some cultivars edible immediately.^[41]

The curing process may take from a few days, with lye, to a few months with brine or salt packing.^[44] With the exception of California style and salt cured olives, all methods of curing involve a major fermentation involving bacteria and yeast that is of equal importance to the final table olive product.^[45] Traditional cures, using the natural microflora on the fruit to induce fermentation, lead to two important outcomes: the leaching out and breakdown of oleuropein and other unpalatable phenolic compounds and the generation of favourable metabolites from bacteria and yeast, such as organic acids, probiotics, glycerol and esters, which affect the sensorial properties of the final table olives.^[41] The probiotic qualities of mixed bacterial/yeast olive fermentations is only recently being explored.^{[46][47]} Of all the metabolites lactic acid is the most important as it acts as a natural preservative lowering the pH of the solution to make the final product more stable against the growth of unwanted pathogenic species. The result is table olives which will store with or without refrigeration and thus, Lactic acid bacteria (LAB) dominated fermentations are generally considered the most suitable method of curing olives. Yeast dominated fermentations produce a different suite of metabolites which have less self-preservation characteristics and therefore acid corrected, often with citric acid, in the final processing stage to achieve microbial stability.^[48]

There are many types of preparations for table olives depending on local tastes and traditions. The most important commercial examples are:

Spanish or Sevillian type (Olives with fermentation). Most commonly applied to green olive preparation. Around 60% of all the worlds table olives are produced with this method.^[49] Olives are soaked in lye (Dilute NaOH, 2-4%) for 8–10 hours to hydrolyse the oleuropein. They are usually considered "treated" when the lye has penetrated two-thirds of the way into the fruit. They are then washed once or several times in water to remove the caustic solution and transferred to fermenting vessels full of brine at typical concentrations of 8-12% NaCl.^[50] The brine is changed on a regular basis to help remove the phenolic compounds. Fermentation is carried out by the natural microbiota present on the olives that survive the lye treatment process. Many organisms are involved, usually reflecting the local conditions or "Terroir" of the olives. During a typical fermentation gram-negative enterobacteria flourish in small numbers at first, but are rapidly outgrown by Lactic acid bacteria species such as *Leuconostoc mesenteroides*, *Lactobacillus plantarum*, *Lactobacillus brevis* and *Pediococcus damnosus*. These bacteria

produce lactic acid to help lower the acidity of the brine and therefore stabilize the product against unwanted pathogenic species. A diversity of yeasts then accumulate in sufficient numbers to help complete the fermentation alongside the lactic acid bacteria. Yeast commonly mentioned include the teleomorphs *Pichia anomala*, *Pichia membranifaciens*, *Debaryomyces hansenii* and *Kluyveromyces marxianus*.^[48] Once fermented, the olives are placed in fresh brine and acid corrected ready for market.

Sicilian or Greek type. (Olives with fermentation). Applied to green, semi-ripe and ripe olives. Almost identical the Spanish type fermentation process, however the lye treatment process is skipped and the olives are placed directly in fermentation vessels full of brine (8-12% NaCl). The brine is changed on a regular basis to help remove the phenolic compounds. As the caustic treatment is avoided, Lactic acid bacteria are only present in similar numbers to yeast and appear to be outcompeted by the abundant yeasts found on untreated olives. As there is very little acid produced by the yeast fermentation, lactic, acetic or citric acid is often added to the fermentation stage to stabilize the process.^[45]

Picholine or directly-brined type. (Olives with fermentation). Can be applied to green, semi-ripe or ripe preparations. Olives are soaked in lye typically for longer periods than Spanish style (e.g. 10–72 hours) until the solution has penetrated three-quarters of the way into the fruit. They are then washed and immediately brined and acid corrected with citric acid to achieve microbial stability. Fermentation still occurs carried out by acidogenic yeast and bacteria, but is more subdued than other methods. The brine is changed on a regular basis to help remove the phenolic compounds and a series of progressively stronger concentrations of NaCl are added until the product is fully stabilized and ready to be eaten.^[48]

Water-cured type. (Olives with fermentation). Can be applied to green, semi-ripe or ripe preparations. Olives are soaked in water or weak brine and this solution is changed only a daily basis for 10–14 days. The oleuropein is naturally dissolved and leached into the water and removed during a continual soak-wash cycle. Fermentation takes place during the water treatment stage and involves a mixed yeast/bacteria ecosystem. Once debittered the olives are brined to concentrations of 8-12% NaCl, acid corrected and ready to eat.^[45]

Salt-cured type. (Olives with minor fermentation). Applied only to ripe olives and usually produced by Morocco or Turkey and other eastern mediterranean countries. Once picked, the olives are vigorously washed and packed in alternating layers with salt. The high concentrations of salt draw the moisture out of olives, dehydrating and shrivelling them to they look somewhat analogous to a raisin. Once packed in salt fermentation is minimal and only initiated by the most halophilic yeast species such as *Debaryomyces hansenii*. Once cured, they are sold in their natural state without any additives.^[48]

California or "artificial ripening" type. (Olives without fermentation). Applied to green and semi-ripe olives. Olives are placed in lye and soaked. Upon their removal they are washed in water injected with compressed air. This process is repeated several times until both oxygen and lye have soaked through to the pit. The repeated, saturated exposure to air oxidises the skin and flesh of the fruit, turning it black in an artificial process that mimics natural ripening. Once fully oxidised or "blackened", they are brined and acid corrected ready for eating.^[45]

Olive wood

Olive wood is very hard and is prized for its durability, colour, high combustion temperature and interesting grain patterns. Because of the commercial importance of the fruit, and the relatively small size of the tree, olive wood and its products are relatively expensive. Common uses of the wood include: kitchen utensils, carved wooden bowls, cutting boards, fine furniture, and decorative items.

Cultivation



An example of black, ripe olives

The earliest evidence for the domestication of olives comes from the [Chalcolithic Period](#) archaeological site of Teleilat Ghassul in what is today modern [Jordan](#). Farmers in ancient times believed that olive trees would not grow well if planted more than a certain distance from the sea; [Theophrastus](#) gives 300 [stadia](#) (55.6 km or 34.5 mi) as the limit. Modern experience does not always confirm this, and, though showing a preference for the coast, they have long been grown further inland in some areas with suitable climates, particularly in the southwestern Mediterranean ([Iberia](#), northwest [Africa](#)) where winters are mild.



Olive plantation in Andalucía, Spain

Olives are now cultivated in many regions of the world with [Mediterranean climates](#), such as [South Africa](#), [Chile](#), [Peru](#), [Australia](#), and [California](#) and in areas with temperate climates such as [New Zealand](#), under irrigation in the [Cuyo](#) region in Argentina which has a desert climate. They are also grown in the [Córdoba Province, Argentina](#), which has a temperate climate with rainy summers and dry winters (Cwa).^[51] The climate in Argentina changes the external characteristics of the plant but the fruit keeps its original features.^[52] The northernmost olive grove is placed in [Anglesey](#), an island off the north west coast of [Wales](#), in the [United Kingdom](#).^[53] but it is too early to say if the growing will be successful, having been planted in 2006.



Olives at a market in [Toulon, France](#)

Growth and propagation



Olive trees on [Thassos](#), Greece

Olive trees, *Olea europaea*, show a marked preference for [calcareous soils](#), flourishing best on [limestone](#) slopes and crags, and coastal climate conditions. They grow in any light soil, even on clay if well drained, but in rich soils they are predisposed to disease and produce poorer oil than in poorer soil. (This was noted by [Pliny the Elder](#).) Olives like hot weather and sunny positions without any shade while temperatures below $-10\text{ }^{\circ}\text{C}$ ($14\text{ }^{\circ}\text{F}$) may injure even a mature tree. They tolerate [drought](#) well, thanks to their sturdy and extensive [root](#) system. Olive trees can live for several centuries, and can remain productive for as long if they are pruned correctly and regularly.

In situations where extreme cold has damaged or killed the olive tree the rootstock can survive and produce new shoots which in turn become new trees. In this way olive trees can regenerate themselves. In Tuscany in 1985 a very severe frost destroyed many productive, and aged, olive trees and ruined many farmers' livelihoods. However new shoots appeared in the spring and, once the dead wood was removed, became the basis for new fruit-producing trees. In this way an olive tree can 'live' for centuries or even millennia.

Olives grow very slowly, and over many years the trunk can attain a considerable diameter. [A. P. de Candolle](#) recorded one exceeding 10 m (33 ft) in girth. The trees rarely exceed 15 m (49 ft) in height, and are generally confined to much more limited dimensions by frequent pruning. The yellow or light greenish-brown wood is often finely veined with a darker tint; being very hard and close-grained, it is valued by woodworkers. There are only a handful of olive varieties that can be used to cross-pollinate. Pendolino olive trees are partially self-fertile, but pollenizers are needed for a large fruit crop. Other compatible olive tree pollenizers include Leccino and Maurino. Pendolino olive trees are used extensively as pollenizers in large olive tree groves.

Olives are propagated by various methods. The preferred ways are cuttings and layers; the tree roots easily in favourable soil and throws up [suckers](#) from the stump when cut down. However, yields from trees grown from suckers or seeds are poor; they must be [budded](#) or [grafted](#) onto other specimens to do well (Lewington and Parker, 114). Branches of various thickness cut into lengths of about 1 m (3.3 ft) planted deeply in [manured](#) ground soon vegetate. Shorter pieces are sometimes laid horizontally in shallow trenches and, when covered with a few centimetres of soil, rapidly throw up sucker-like shoots. In Greece, grafting the cultivated tree on the wild tree is a common practice. In Italy, embryonic buds, which form small swellings on the stems, are carefully excised and planted under the soil surface, where they soon form a vigorous shoot.

The olive is also sometimes grown from seed. To facilitate [germination](#), the oily pericarp is first softened by slight rotting, or soaked in hot water or in an [alkaline](#) solution.

Where the olive is carefully cultivated, as in [Languedoc](#) and [Provence](#), the trees are regularly pruned. The pruning preserves the flower-bearing shoots of the preceding year, while keeping the tree low enough to allow the easy gathering of the fruit. The spaces between the trees are regularly fertilized. The crop from old trees is sometimes enormous, but they seldom bear well two years in succession, and in many cases a large harvest occurs every sixth or seventh season.

Old olive trees



Olive tree older than 1,500 years, [Kaštela, Croatia](#)



Olive tree in [Bar, Montenegro](#) which is over 2,000 years old



Olive tree, [Karystos](#), [Euboia](#), Greece



An ancient olive tree in [Pelion](#), [Greece](#)

The olive tree, *Olea europaea*, is very hardy: drought-, disease- and fire-resistant, it can live to a great age. Its root system is robust and capable of regenerating the tree even if the above-ground structure is destroyed. The older the olive tree, the broader and more gnarled the trunk becomes. Many olive trees in the groves around the Mediterranean are said to be hundreds of years old, while an age of 2,000 years is claimed for a number of individual trees; in some cases, this has been scientifically verified.^[54]

[Pliny the Elder](#) told about a sacred [Greek](#) olive tree that was 1,600 years old. An olive tree in west Athens, named "Plato's Olive Tree", was said^{[[by whom?](#)]} to be a remnant of the grove within which [Plato's Academy](#) was situated, which would make it approximately 2,400 years old. The tree comprised a cavernous trunk from which a few branches were still sprouting in 1975, when

a traffic accident caused a bus to fall on and uproot it. Since then, the trunk has been preserved and displayed in the nearby [Agricultural University of Athens](#). A supposedly older tree, the "Peisistratos Tree", is located by the banks of the [Cephisus](#) River, in the municipality of [Agiioi Anargyroi](#), and is said to be a remnant of an olive grove that was planted by Athenian tyrant [Peisistratos](#) in the 6th century BC. Numerous ancient olive trees also exist near [Pelion](#) in Greece.^[55] The age of an olive tree in [Crete](#), the Finix Olive is claimed to be over 2,000 years old; this estimate is based on archaeological evidence around the tree.^[56]

An olive tree in [Algarve, Portugal](#), is 2000 years old, according to [radiocarbon dating](#).^[54]

An olive tree in [Bar, Montenegro](#), is claimed to be over 2,000 years old.^[57]

An olive tree on the island of [Brijuni](#) (Brioni), [Istria](#) in [Croatia](#), has been calculated to be about 1,600 years old. It still gives fruit (about 30 kg or 66 lb per year), which is made into top quality olive oil.^[58]

The town of Bshaale, Lebanon claims to have the oldest olive trees in the world (4000 BC for the oldest), but no scientific study supports these claims. Other trees in the towns of [Amioun](#) appear to be at least 1,500 years old.^{[59][60]}

There are dozens of ancient olive trees throughout Israel and Palestine whose age has earlier been estimated to be 1,600–2,000 years old; however, these estimates could not be supported by current scientific practices.^[61] Ancient trees include two giant olive trees in [Arraba](#) and five trees in [Deir Hanna](#), both in the [Galilee](#) region, which have been determined to be over 3,000 years old,^[61] although there is no available data to support the credibility of the study that produced these age estimates and as such the 3000 years age estimate can not be considered valid.^[62] All seven trees continue to produce olives. Several trees in the [Garden of Gethsemane](#) (from the Hebrew words "gat shemanim" or olive press) in Jerusalem are claimed to date back to the purported time of [Jesus](#).^[63]

Some Italian olive trees are believed to date back to Roman times, although identifying progenitor trees in ancient sources is difficult. A tree located in *Santu Baltolu di Carana* (municipality of [Luras](#)) in [Sardinia, Italy](#), named with respect as the *Ozzastru* by the inhabitants of the region, is claimed to be 3,000 to 4,000 years old according to different studies.^[citation needed] There are several other trees of about 1,000 years old within the same garden. The 15th-century trees of *Olivo della Linza* located in Alliste [province of Lecce](#) in [Puglia](#) were noted by Bishop Ludovico de Pennis during his pastoral visit to the [Roman Catholic Diocese of Nardò-Gallipoli](#) in 1452.^[64]

Pests, diseases, and weather

There are various [pathologies](#) that can affect olives. The most serious pest is the [olive fruit fly](#) (*Bactrocera oleae*) which lays its eggs in the olive most commonly just before it becomes ripe in the autumn. The region surrounding the puncture rots, becomes brown and takes a bitter taste making the olive unfit for eating or for oil. For controlling the pest the practice has been to spray with insecticides ([organophosphates](#), e.g. [dimethoate](#)). Classic organic methods have now been

applied such as trapping, applying the bacterium [Bacillus thuringiensis](#) and spraying with [kaolin](#). Such methods are obligatory for organic olives.

A [fungus](#), *Cycloconium oleaginum*, can infect the trees for several successive seasons, causing great damage to plantations. A species of [bacterium](#), *Pseudomonas savastanoi* pv. *oleae*,^[65] induces tumour growth in the shoots. Certain [lepidopterous caterpillars](#) feed on the leaves and flowers.

A pest which spreads through olive trees is the black scale bug, a small black [scale insect](#) that resembles a small black spot. They attach themselves firmly to olive trees and reduce the quality of the fruit; their main predators are [wasps](#). The [curculio beetle](#) eats the edges of leaves, leaving sawtooth damage.^[66]

[Rabbits](#) eat the bark of olive trees and can do considerable damage, especially to young trees. If the bark is removed around the entire circumference of a tree it is likely to die.

At the northern edge of their cultivation zone, for instance in Southern France and north-central Italy, olive trees suffer occasionally from [frost](#). [Gales](#) and long-continued rains during the gathering season also cause damage.

As an invasive species



Olives as invasive weeds, [Adelaide Hills](#), [Australia](#)

Since its first domestication, *Olea europaea* has been spreading back to the wild from planted groves. Its original wild populations in southern Europe have been largely swamped by feral plants.^[67]

In some other parts of the world where it has been introduced, most notably [South Australia](#), the olive has become a major woody [weed](#) that displaces native vegetation. In South Australia, its seeds are spread by the introduced [red fox](#) and by many bird species, including the [European starling](#) and the native [emu](#), into woodlands, where they germinate and eventually form a dense canopy that prevents regeneration of native trees.^[68] As the climate of South Australia is very dry and bushfire prone, the oil rich feral olive tree substantially increases the fire hazard of native [sclerophyll](#) woodlands.^[69]

Fruit harvest and processing



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Ripening Black Olives.

Olives are harvested in the [autumn](#) and [winter](#). More specifically in the Northern hemisphere, green olives are picked at the end of September to about the middle of November. Blond olives are picked from the middle of October to the end of November and black olives are collected from the middle of November to the end of January or early February. In southern Europe, harvesting is done for several weeks in winter, but the time varies in each country, and with the season and the cultivar.

Most olives today are harvested by shaking the boughs or the whole tree. Using olives found lying on the ground can result in poor quality oil, due to damage. Another method involves standing on a ladder and "milking" the olives into a sack tied around the harvester's waist. This method produces high quality oil.^[70] A third method uses a device called an oli-net that wraps around the tree trunk and opens to form an [umbrella](#)-like catcher from which workers collect the fruit. Another method uses an electric tool, 'the oliviera', that has large [tongs](#) that spin around quickly, removing fruit from the tree. Olives harvested by this method are used for oil.

Table olive varieties are more difficult to harvest, as workers must take care not to damage the fruit; baskets that hang around the worker's neck are used. In some places in Italy, Croatia and Greece, olives are harvested by hand because the terrain is too mountainous for machines. As a result, the fruit is not bruised, which leads to a superior finished product. The method also involves sawing off branches, which is healthy for future production.^[42]

The amount of oil contained in the fruit differs greatly by cultivar; the [pericarp](#) is usually 60–70% oil. Typical yields are 1.5–2.2 kg (3.3–4.9 lb) of oil per tree per year.^[56]

Production

Olives are one of the most extensively cultivated fruit crops in the world.^[71] In 2011 there were about 9.6 million hectares planted with olive trees, which is more than twice the amount of land devoted to apples, bananas or mangoes. Only coconut trees and oil palms command more space.^[72] Cultivation area tripled from 2,600,000 to 7,950,000 hectares (6,400,000 to 19,600,000 acres) between 1960 and 1998 and reached a 10 million ha peak in 2008. The ten largest producing countries, according to the [Food and Agriculture Organization](#), are all located in the Mediterranean region and produce 95% of the world's olives.

Main countries of production (Year 2011 per FAOSTAT)^[73]

Rank	Country/Region	Production (in tons)	Cultivated area (in hectares)	Yield (g /Ha)
—	World	19,845,300	9,634,576	20.598
01	 Spain	7,820,060	2,330,400	29.781
02	 Italy	3,182,204	1,144,420	27.806
03	 Greece	2,000,000	850,000	23.529
04	 Turkey	1,750,000	798,493	21.916
05	 Morocco	1,415,902	597,513	22.839
06	 Syria	1,095,043	684,490	15.997
07	 Algeria	610,776	295,000	14.237
08	 Tunisia	562,000	1,779,950	4.848
09	 Egypt	459,650	52,668	87.273
10	 Portugal	443,800	343,200	12.931

Nutrition

Olives, green



Marinated green olives

Nutritional value per 100 g (3.5 oz)

Energy 609 kJ (146 kcal)

Carbohydrates 3.84 g

Sugars 0.54 g

Dietary fiber 3.3 g

Fat 15.32 g

Saturated 2.029 g

Monounsaturated 11.314 g

Polyunsaturated 1.307 g

Protein 1.03 g

Vitamins

(3%)

Vitamin A equiv. 20 µg

beta-carotene (2%)

lutein zeaxanthin 231 µg

510 µg

Thiamine (B1) (2%)
0.021 mg

Riboflavin (B2) (1%)
0.007 mg

Niacin (B3) (2%)
0.237 mg

Vitamin B6 (2%)
0.031 mg

Folate (B9) (1%)
3 µg

Choline (3%)
14.2 mg

Vitamin E (25%)
3.81 mg

Vitamin K (1%)
1.4 µg

Trace metals

Calcium (5%)
52 mg

Iron (4%)
0.49 mg

Magnesium (3%)
11 mg

	(1%)
Phosphorus	4 mg
	(1%)
Potassium	42 mg
	(104%)
Sodium	1556 mg

[Link to USDA Database entry](#)

- Units
- μg = [micrograms](#) • mg = [milligrams](#)
- IU = [International units](#)

Percentages are roughly approximated using

[US recommendations](#) for adults.

Source: [USDA Nutrient Database](#)

Olive tree parts, and olive oil, have a number of common phenolic compounds that might possess positive health effect to the human body, ^[citation needed] as well as a good source of [Vitamin E](#). The processing of olives (fruit) especially affects their phenolic content, but other parts of the plant also contain phenolics, such as [leaves](#) and bark.

The addition of iron salts such as [Iron\(II\) gluconate](#), as commonly in canned olives, drastically reduces phenolic content, especially [hydroxytyrosol](#). Total polyphenol contents, as measured by the [Folin method](#), are 117 mg/100 g in black olives and 161 mg/100 g in green olives, as compared to 55 and 21 mg/100 g for extra virgin and virgin olive oil respectively.^[74] Olive fruits contain several types of polyphenols, mainly tyrosols, phenolic acids, flavonols and flavones, and for black olives, anthocyanins. During the crushing, kneading and extraction of olive fruits to obtain olive oil, the glycosidic [oleuropein](#), demethyloleuropein and ligstroside are hydrolyzed by endogenous [Beta-glucosidases](#), to form aldehydic [aglycones](#). The aglycones become soluble in the oil phase, whereas the glycosides remain in the water phase, fresh [cloudy olive oil](#) contains the added benefit of these water phase phenolics. [Lignans](#) are also found in olive fruits and oils.

Among the phenolics are:^[74]

- [tyrosols](#) (most abundant)
 - [oleuropein](#) 72 mg/100g (black) and 56 mg/100g (green)

- free [hydroxytyrosol](#) (3,4-DHPEA) 82 mg/100g (black) and 59 mg/100g (green)
- demethyloleuropein 23 mg/100g (black) and 13 mg/100g (green)
- [oleoside](#) (young fruits)
- Hydroxytyrosol-elenolate
- Hydroxytyrosol-1-glucoside
- Hydroxytyrosol-4-glucoside
- oleoside-methylester
- 3,4-DHPEA-EDA in fruits but more in olive oils.
- [Coumaric acids](#), all 3 types o, m, and p.
- [anthocyanins](#) -fruit only
 - [3-O-rutinoside](#)
 - [cyanidin 3-O-glucoside](#)
- [flavonols](#)—fruit only
 - [Quercetin 3-O-rutinoside](#)
 - [Quercetin 3-O-rhamnoside](#)
- [Flavones](#)
 - [Luteolin 7-O-glucoside](#) - major
 - [Luteolin](#)
 - [luteolin 6-C-glucoside](#)
 - [apigenin 7-O-glucoside](#)
 - [apigenin 7-O-rutinoside](#)
- methyl acetal of the aglycone of ligstroside
- β -hydroxytyrosol ester of methyl malate
- [Verbascoside](#)
- [sinapic acid](#)
- [syringic acid](#)
- [protocatechuic acid](#)
- [4-hydroxybenzoic acid](#)
- [p-hydroxyphenylpropanoic acid](#)
- [4-hydroxyphenylacetic acid](#)
- [3-methoxy-4-hydroxyphenylacetic acid](#)
- [ferulic acid](#)
- [caffeic acid](#)

