

EXHIBIT 7

Rose

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A **rose** is a flowering ([/entry/Flowering_plant](#)) shrub ([/entry/Shrub](#)) of the genus **Rosa**. There are more than a hundred species ([/entry/Species](#)) of wild roses, which are endemic (native) only to the Northern Hemisphere. The term is also used to refer to the flower ([/entry/Flower](#)) of this shrub.

Roses are members of the family Rosaceae, which is one of the largest families of flowering plants ([/entry/Flowering_plants](#)) with about 3,400 species including apples ([/entry/Apple](#)), berries, peaches ([/entry/Peach](#)), plums ([/entry/Plum](#)), cherries ([/entry/Cherry](#)), the hawthorn tree, the mountain ash, and many others.

Few plants have had such a hold on the human imagination as the rose. The value of a rose is not so much in its fruit ([/entry/Fruit](#))—although, the fruits have some nutritional and commercial value. Rather, the chief value of a rose comes in its being a symbol of love ([/entry/Love](#)) and beauty ([/entry/Beauty](#)). It appears in art, is exchanged as a symbol of love, its fragrance is captured in perfumes, and it adorns gardens and public spaces. Shakespeare captured some of the rose's poetic use in Sonnet 54, drawing analogy with the person's true value being his or her virtue, which survives even after the person is gone ("the rose looks fair, but fairer we it deem for that sweet ordour which doth in it live"). In the song, *The Rose*, the rose symbolizes hope: "Just remember in the winter, far beneath the bitter snow, lies the seed that with the sun's love, in the spring becomes the rose."

The name "rose" originates from Persian *vrda*, via Greek *rhodon* "rose" (Aeolic *wrodon*).

Wild roses

Wild roses form a group of generally thorny shrubs or climbers, and sometimes trailing plants, reaching 2 to 5 meters (6 to 18 feet) in height, rarely reaching as high as 20 meters (65 feet) by climbing over other plants.

The leaves of most species are 5 to 15 cm (2 to 6 inches) long, pinnate, with three to thirteen leaflets and basal stipules; the leaflets usually have a serrated margin and often a few small thorns on the underside of the stem. The vast majority of roses are deciduous, but a few (particularly in Southeast Asia) are evergreen or nearly so.

The flowers ([/entry/Flower](#)) have five petals (with the exception of *Rosa sericea* which often has only four), usually white or pink, in a few species yellow or red. The ovary is inferior, developing below the petals and sepals.



[\(/entry/File:Rosa_canina_hips\)](#)
Rosa canina hips

The fruit ([/entry/Fruit](#)) of the rose is a berry-like structure called a rose *hip*. The hips of most species are red, but a few (e.g. *Rosa pimpinellifolia*) have dark purple to black hips. Each hip comprises an outer fleshy layer, the hypanthium, which contains 5 to 160 "seeds" (technically dry, single-seeded fruits called achenes) embedded in a matrix of fine, but stiff, hairs. Rose hips of some species, especially the dog rose (*Rosa canina*) and rugosa rose (*Rosa rugosa*), are very rich in vitamin ([/entry/Vitamin](#)) C, among the richest sources of any plant. The hips are eaten by fruit-eating birds ([/entry/Bird](#)) such as thrushes and waxwings, which then disperse the seeds in their droppings. Some birds, particularly finches, also eat the seeds. People also sometimes eat rose hips, mainly for their vitamin C content. They are usually pressed and filtered to make rose-hip syrup, as the fine hairs surrounding the seeds are unpleasant to eat (resembling itching powder). They can also be used to make herbal tea, jam, jelly, and marmalade. During the Second World War ([/entry/World_War_II](#)), rose hips were an important source of vitamin C in Great Britain when other fruits were scarce.

Most roses have thorns or prickles. The thorns are typically sickle-shaped hooks, which aid the rose in hanging onto other vegetation when growing over it. Some species, such as *Rosa rugosa* and *R. pimpinellifolia*, instead have densely packed straight spines, probably an adaptation to reduce browsing by animals, but also possibly an adaptation to trap wind-blown sand ([/entry/Sand](#)) and so reduce erosion ([/entry/Erosion](#)) and protect their roots ([/entry/Root](#)) (both of these two species grow naturally on coastal sand dunes). Despite the presence of the thorns, roses are frequently browsed by deer ([/entry/Deer](#)). A few species of roses only have vestigial thorns that have no points.

Classification

There is significant disagreement over the number of true rose species ([/entry/Species](#)). Some species are so similar that they could easily be considered variations of a single species, while other species show enough variation that they could easily be considered to be different species. Lists of rose species usually show between 100 and 150 with most botanists ([/entry/Botany](#)) agreeing that the actual number is probably nearer the lower end of that range.

Subgenera and sections

[? \(/entry/info:How_to_read_a_taxonomy\)](#)

Rose



[\(/entry/File:Wild_rose_flower.jpg\)](#)
Rosa canina (Dog Rose) flower

Scientific classification

[\(/entry/Scientific_classification\)](#)

Kingdom:	Plantae (/entry/Plant)
Division:	Magnoliophyta (/entry/Flowering_plant)
Class:	Magnoliopsida
Order:	Rosales
Family:	Rosaceae
Subfamily:	Rosoideae
Genus:	Rosa L. (/entry/Carolus_Linnaeus)

Species

About 100 to 150, see classification
[\(/entry/Rose#Classification\)](#)

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The genus *Rosa* is subdivided into four subgenera:

- **Hulthemosa** (formerly *Simplicifoliae*, meaning "with single leaves") containing one or two species from Southwest Asia, *R. persica* and *R. berberifolia* (syn. *R. persica* var. *berberifolia*), which are the only roses without compound leaves (/entry/Leaf) or stipules.
- **Hesperrhodod** (from the Greek for "western rose") has two species, both from southwestern North America. These are *R. minutifolia* and *R. stellata*.
- **Platyrhodon** (from the Greek for "flaky rose," referring to flaky bark) with one species from East Asia, *R. roxburghii*.
- **Rosa** the subgenus containing all the other roses.



(/entry/File:Rosa-multiflora01.jpg)
Rosa multiflora

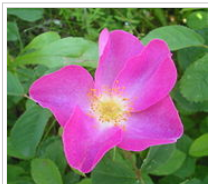
The subgenus *Rosa* is subdivided into 11 sections.

- **Banksianae** – white and yellow roses from China
- **Bracteatae** – three species, two from China and one from India (/entry/India)
- **Caninae** – pink and white species from Asia, Europe, and North Africa (/entry/Africa)
- **Carolinae** – white, pink, and bright pink species all from North America
- **Chinensis** – white, pink, yellow, red, and mixed-color roses from China and Burma (/entry/Burma)
- **Gallicanae** – pink to crimson and striped roses from western Asia and Europe
- **Gymnocarpae** – a small group distinguished by a deciduous receptacle on the hip; one species in western North America (*R. gymnocarpa*), the others in East Asia
- **Laevigatae** – a single white species from China
- **Pimpinellifoliae** – white, pink, bright yellow, mauve, and striped roses from Asia and Europe
- **Rosa** (syn. sect. *Cinnamomeae*) – white, pink, lilac, mulberry, and red roses from everywhere but North Africa
- **Synstylae** – white, pink, and crimson roses from all areas



(/entry/File:Rosa_rugosa1.jpg)
Rosa rugosa

Species



(/entry/File:Wild_Rosa_gallica.jpg)
Rosa gallica

Some representative wild rose species

- *Rosa acicularis* - Arctic Rose, Prickly Rose (*Rosa*)
- *Rosa canina* - Dog Rose, Briar Bush
- *Rosa dumalis* - Glaucous Dog Rose
- *Rosa eglanteria* (syn. *R. rubiginosa*) - Eglantine, Sweet Brier
- *Rosa gallica* - Gallic Rose, French Rose
- *Rosa gigantea* (syn. *R. x odorata gigantea*)
- *Rosa glauca* (syn. *R. rubrifolia*) - Redleaf Rose
- *Rosa laevigata* (syn. *R. sinica*) - Cherokee Rose, Camellia Rose, Mardan Rose
- *Rosa multiflora* - Multiflora Rose
- *Rosa persica* (syn. *Hulthemia persica*, *R. simplicifolia*)
- *Rosa roxburghii* - Chestnut Rose, Burr Rose
- *Rosa rugosa* - Rugosa Rose, Japanese Rose
- *Rosa stellata* - Gooseberry Rose, Sacramento Rose
- *Rosa virginiana* (syn. *R. lucida*) - Virginia Rose
- *Rosa woodsii* - Mountain Rose

Roses in cultivation



(/entry/File:Rosa_alba_semi-plena_img_2175.jpg)
R. alba 'Semi-plena'



(/entry/File:Rosa_alba2.jpg)
Rosa alba 'Maiden's Blush'



(/entry/File:Rose_zepherine_d
Rose 'Zéphérine Drouhin'

Roses were first cultivated in China about 5,000 years ago, whether for their beauty or for their edible fruit is not known. Later, they were cultivated in India (/entry/India), Persia (/entry/Persia), the Middle East, and Europe. In ancient Rome, roses were very popular, not only for their beauty but also for food and for many medicinal uses. They were also cultivated in the New World. Bernal Díaz del Castillo, who fought in Cortez's (/entry/Hernan_Cortez) army, described the gardens of Mexico City in his book *The Discovery and Conquest of Mexico*:

When we had looked well at all of this, we went to the orchard and garden, which was such a wonderful thing to see and walk in, that I was never tired of looking at the diversity of the trees, and noting the scent which each one had, and the paths full of roses and flowers, and the many fruit trees and native roses, and the pond of fresh water.

Rose cultivation increased in popularity in the fifteenth and sixteenth centuries, especially in Holland, when trading ships brought rose bushes from China. These were crossed with European roses creating many new varieties.

The popularity of roses never slowed down and continues today. In 1994, over 1.2 billion roses were purchased by U.S. flower buyers; 4.67 per person. In three national public opinion polls between 1975 and 1986, over 85 percent of Americans named the rose as their favorite flower [1] (http://www.rosesinc.org/ICFG/For_Consumers/Everything.asp).

There is no single system of classification for garden roses. In general, however, roses are placed in one of three main groups:

- **Wild Roses** – The wild roses includes the species listed above and some of their hybrids.
- **Old Garden Roses** – Most old garden roses are classified into one of the following (ordered by approximate age—oldest first):
 - **Alba** – Literally "white roses," derived from *R. arvensis* and the closely allied *R. alba*. These are some of the oldest garden roses, probably brought to Great Britain (/entry/United_Kingdom) by the Romans. Once-flowering. Examples: "Semi-plena," "White Rose of York."
 - **Gallica** – The Gallica roses have been developed from *R. gallica* which is a native of central and southern Europe. They flower once in the summer. Examples: "Cardinal de Richelieu," "Charles de Mills," "Rosa Mundi" (*R. gallica versicolor*).
 - **Damask** – Robert de Brie is given credit for bringing them from Persia to Europe sometime between 1254 and 1276. Summer damasks (crosses between Gallica roses and *R. phoenicea*) bloom once in summer. Autumn damasks (Gallicas crossed with *R. moschata*) bloom later, in the autumn. Examples: "Ispahan," "Madame Hardy."
 - **Centifolia (or Provence)** – These roses, raised in the seventeenth century in the Netherlands (/entry/Netherlands), are named for their "one hundred" petals. Once-flowering. Examples: "Centifolia," "Paul Ricault."
 - **Moss** – Closely related to the centifolias, these have a mossy excrescence on the stems and sepals. Once-flowering. Examples: "Comtesse de Murinais," "Old Pink Moss."
 - **China** – The China roses brought with them an amazing ability to bloom repeatedly throughout the summer and into late autumn. Four china roses ("Slater's Crimson China," 1792; "Parsons' Pink China," 1793; "Hume's Blush China," 1809; and "Parks' Yellow Tea Scented China," 1824) were brought to Europe in the late eighteenth and nineteenth centuries, which brought about the creation of the repeat-flowering old garden roses and later the modern garden roses. Examples: "Old Blush China," "Mutabilis."
 - **Portland** – These are named after the Duchess of Portland who received (from Italy (/entry/Italy) in 1800) a rose then known as *R. paestana* or "Scarlet Four Seasons' Rose" (now known simply as "The Portland Rose"). This group was developed from that rose. Repeat-flowering. Example: "James Veitch," "Rose de Rescht," "The Portland Rose."
 - **Bourbon** – They originated on l'Île de Bourbon (now called Réunion). Probably the result of a cross between the autumn damask and the "Old Blush China." Introduced in France (/entry/France) in 1823. Repeat-flowering. Examples: "Louise Odier," "Mme. Pierre Oger," "Zéphirine Drouhin."
 - **Hybrid Perpetual** – The dominant class of roses in Victorian England, they were derived to a great extent from the Bourbons. Repeat-flowering. Examples: "Ferdinand Pichard," "Reine Des Violettes."
 - **Tea** – The result of crossing two of the original China Roses ("Hume's Blush China" and "Parks' Yellow Tea Scented China") with various Bourbons and Noisette roses. Somewhat more tender than other old garden roses (most likely because of *R.*

gigantea in the ancestry of the Parks rose), teas are repeat-flowering roses, although their fragrance is not always a tea scent. Example: "Lady Hillingdon."

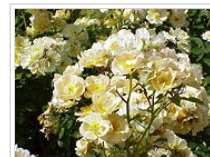
- **Bermuda "Mystery" Roses** – A group of several dozen "found" roses that have been grown in Bermuda for at least a century. The roses have significant value and interest for those growing roses in tropical and semi-tropical regions, since they are highly resistant to both nematode (/entry/Nematode) damage and the fungal (/entry/Fungus) diseases that plague rose culture in hot, humid areas, and they are capable of blooming in hot and humid weather. Most of these roses are likely old garden rose cultivars that have otherwise dropped out of cultivation, or sports thereof. They are "mystery roses" because their "proper" historical names have been lost. Tradition dictates that they are named after the owner of the garden where they were rediscovered.
- **Miscellaneous** – There are also a few smaller classes (such as Scots, Sweet Brier) and some climbing classes of old roses (including Ayrshire, Climbing China, Laevigata, Sempervirens, Noisette, Boursault, Climbing Tea, and Climbing Bourbon). Those classes with both climbing and shrub forms are often grouped together.
- **Modern Garden Roses** – Classification of modern roses can be quite confusing because many modern roses have old garden roses in their ancestry and their form varies so much. The classifications tend to be by growth and flowering characteristics, such as "large-flowered shrub," "recurrent, large-flowered shrub," "cluster-flowered," "rambler recurrent," or "ground-cover non-recurrent." Many of the most popular modern cultivars can however be assigned to one of these two groups:
 - **Hybrid Tea** – The "long stem" rose. Most roses sold by florists and at roadside flower stands are Hybrid Teas. They typically have one to at most five or six large flowers per stem, the flower with numerous tightly arranged petals with reflexed tips (see photo, right). They are favored in small gardens in formal situations, and for buttonhole roses.
 - **Floribunda** – Flowers are often smaller, in large clusters of ten or more (often many more) on each stem. These tend to give a more prominent display from a distance, so are more often used in large bedding schemes in public parks and similar spaces.



(/entry/File:Rosa_sp.163.jp
"Königin der Rosen," a modern Hybrid Tea rose

Perfume

The making of perfume from rose petals dates from ancient times and is a major industry today. Rose perfumes are made from **attar of roses** or **rose oil**, which is a mixture of volatile essential oils obtained by steam-distilling the crushed petals of roses. The technique originated in Persia (/entry/Persia) (the word rose itself is from Persian), then spread through Arabia (/entry/Arabia) and India (/entry/India), but nowadays about 70 to 80 percent of production is in the Rose Valley near Kazanluk in Bulgaria (/entry/Bulgaria), with some production in Qamsar, Iran (/entry/Iran), and in Germany (/entry/Germany). The Kaaba in Mecca (/entry/Mecca) is annually washed by the Iranian rose water from Qamsar. In Bulgaria, Iran, and Germany, damask roses (*Rosa damascena* 'Trigintipetala') are used. In the French rose oil industry, *Rosa centifolia* is used. The oil, pale yellow or yellow-gray in color, is sometimes called "Rose Absolute" oil to distinguish it from diluted versions. The weight of oil extracted is about one three-thousandth to one six-thousandth of the weight of the flowers—for example, about 2,000 flowers are required to produce one gram of oil.



(/entry/File:Rosa_sp.61.jpg
'Borussia', a modern Floribunda rose

The main constituents of attar of roses are the fragrant alcohols (/entry/Alcohol) geraniol, which have the empirical formula $C_{10}H_{18}O$ and the structural formula $CH_3.C[CH_3]:CH.CH_2.CH_2.C[CH_3]:CH.CH_2OH$ and l-citronellol; and rose camphor, an odorless paraffin.

Roses and culture



(/entry/File:Roses_renoir.Jl
Renoir (/entry/Pierre-Auguste_Renoir) painting of roses

From ancient times, the rose has had a strong hold on the human imagination, most often as a symbol of love (/entry/Love) and beauty (/entry/Beauty). In ancient times, roses were sacred to the goddesses Isis and Aphrodite. In India, it is believed that one of the wives of the god Vishnu (/entry/Vishnu) was found inside a rose.

Roses were very popular in the Roman Empire (/entry/Roman_Empire). Sometimes the floors of banquet halls were covered in rose petals. After the fall of Rome, roses fell on some disfavor in Europe and were not allowed to be brought into churches, although they were still grown for medicinal use. After a time, the rose's reputation was redeemed and it came to be associated with the Virgin Mary. Roses were carved in wood and stone and "rose windows" were created for church decoration. Prayer beads came to be known as "rosaries," perhaps because they were first made of rosewood and later of a paste of rose petals and salt, and also because of the rose's association with Mary.

Since ancient China, roses have been the subject of art. The French artist Pierre-Joseph Redouté, the official court artist of Queen Marie Antoinette, produced

some of the most detailed paintings of roses.

Roses are so important that the word for rose also means pink or red in some languages, including Spanish, Greek, and Polish.

Roses have been used as badges and symbols. England's Wars of the Roses were fought between the House of Lancaster, symbolized by a red rose, and the House of York, symbolized by a white rose. Today the rose is the national flower of England and the United States and the state or provincial flower of Yorkshire, Alberta, Iowa (/entry/Iowa), North Dakota (/entry/North_Dakota), Georgia (/entry/Georgia_(U.S._state)), and New York (/entry/New_York). The rose came to symbolize the Republic of Georgia (/entry/Republic_of_Georgia)'s non-violent bid for freedom during its Rose Revolution in 2003.



(/entry/File:Redoute_f
A Pierre-Joseph Redouté painting

Rose mythology and superstitions

There are a number of mythologies, folk legends, and superstitions that have developed regarding roses.

Since the earliest times, the rose has been related to the issue of "silence." In Greek mythology, Eros presented a rose to the god of silence. In a Celtic folk legend, a wandering, screaming spirit was silenced by presenting the spirit with a wild rose every new moon. The phrase *sub rosa* or "under the rose" has the meaning of keeping a secret. This practice was derived from the ancient Roman practice of placing a wild rose on the door of a room in which a confidential discussion or meeting was being held.

Among superstitions is the view that if rose leaves are thrown into a burning flame, it will give good luck, and that if a rose bush were pruned on St. John's Eve, it would be guaranteed to bloom in the autumn. This later superstition can be coupled with the Scottish legend that if a white rose bloomed in autumn, it was a token of an early marriage. Another belief is that if a young girl had more than one lover, she should take rose leaves and write the names of her lovers upon them before casting them into the wind. The last leaf to reach the ground would bear the name of the lover whom she should marry.

In some pagan mythologies, no undead or ghostly creatures (particularly vampires) may cross the path of a wild rose. It was thought that to place a wild rose on a coffin of a recently deceased person would prevent him from rising again.

The Peace Rose

The Peace rose is the most famous and successful garden rose of all time. Over one hundred million plants have been sold. It is a Hybrid Tea with very large flowers and a light yellow to cream color. It is very hardy and resistant to disease, making it popular in gardens as well as in the floral trade.

It was developed by French horticulturist Francis Meilland in the years 1935 to 1939. When Meilland foresaw the German invasion of France ([/entry/France](#)), he sent cuttings to friends in Italy ([/entry/Italy](#)), Turkey ([/entry/Turkey](#)), Germany ([/entry/Germany](#)), and the United States ([/entry/United_States](#)) to protect the new rose. It was in the United States that it was given the name Peace on April 29, 1945. This was the very day that Berlin fell, officially considered the end of the Second World War ([/entry/World_War_II](#)) in Europe. Later that year, Peace roses were given to each of the delegations at the inaugural meeting of the United Nations ([/entry/United_Nations](#)) in San Francisco, each with a note that read: "We hope the 'Peace' rose will influence men's thoughts for everlasting world peace."

Peter Beales, English rose grower and expert, said in his book *Roses*: "'Peace', without doubt, is the finest Hybrid Tea ever raised and it will remain a standard variety forever."

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Rose

A **rose** is a woody perennial flowering plant of the genus ***Rosa***, in the family Rosaceae, or the flower it bears. There are over three hundred species and thousands of cultivars. They form a group of plants that can be erect shrubs, climbing, or trailing, with stems that are often armed with sharp prickles. Flowers vary in size and shape and are usually large and showy, in colours ranging from white through yellows and reds. Most species are native to Asia, with smaller numbers native to Europe, North America, and northwestern Africa. Species, cultivars and hybrids are all widely grown for their beauty and often are fragrant. Roses have acquired cultural significance in many societies. Rose plants range in size from compact, miniature roses, to climbers that can reach seven meters in height. Different species hybridize easily, and this has been used in the development of the wide range of garden roses.^[1]

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Etymology

The name *rose* comes from French, itself from Latin *rosa*, which was perhaps borrowed from Oscan, from Greek ῥόδον *rhódon* (Aeolic ῥόδον *wródon*), itself borrowed from Old Persian *wrd-* (*wurdī*), related to Avestan *varəda*, Sogdian *ward*, Parthian *wâr*.^{[2][3]}

Botany

The leaves are borne alternately on the stem. In most species they are 5 to 15 centimetres (2.0 to 5.9 in) long, pinnate, with (3–) 5–9 (–13) leaflets and basal stipules; the leaflets usually have a serrated margin, and often a few small prickles on the underside of the stem. Most roses are deciduous but a few (particularly from Southeast Asia) are evergreen or nearly so.

The flowers of most species have five petals, with the exception of *Rosa sericea*, which usually has only four. Each petal is divided into two distinct lobes and is usually white or pink, though in a few species yellow or red. Beneath the petals are five sepals (or in the case of some *Rosa sericea*, four).



Rose thorns are actually prickles – outgrowths of the epidermis.

These may be long enough to be visible when viewed from above and appear as green points alternating with the rounded petals. There are multiple superior ovaries that develop into achenes.^[4] Roses are insect-pollinated in nature.

The aggregate fruit of the rose is a berry-like structure called a rose hip. Many of the domestic cultivars do not produce hips, as the flowers are so tightly petalled that they do not provide access for pollination. The hips of most species are red, but a few (e.g. *Rosa pimpinellifolia*) have dark purple to black hips. Each hip comprises an outer fleshy layer, the hypanthium, which contains 5–160 "seeds" (technically dry single-seeded fruits called achenes) embedded in a matrix of fine, but stiff, hairs. Rose hips of some species, especially the dog rose (*Rosa canina*) and rugosa rose (*Rosa rugosa*), are very rich in vitamin C, among the richest sources of any plant. The hips are eaten by fruit-eating birds such as thrushes and waxwings, which then disperse the seeds in their droppings. Some birds, particularly finches, also eat the seeds.

The sharp growths along a rose stem, though commonly called "thorns", are technically prickles, outgrowths of the epidermis (the outer layer of tissue of the stem), unlike true thorns, which are modified stems. Rose prickles are typically sickle-shaped hooks, which aid the rose in hanging onto other vegetation when growing over it. Some species such as *Rosa rugosa* and *Rosa pimpinellifolia* have densely packed straight prickles, probably an adaptation to reduce browsing by animals, but also possibly an adaptation to trap wind-blown sand and so reduce erosion and protect their roots (both of these species grow naturally on coastal sand dunes). Despite the presence of prickles, roses are frequently browsed by deer. A few species of roses have only vestigial prickles that have no points.

Species

The genus *Rosa* is subdivided into four subgenera:

- Hulthemia** (formerly *Simplicifoliae*, meaning "with single leaves") containing two species from southwest Asia, *Rosa persica* and *Rosa berberifolia*, which are the only roses without compound leaves or stipules.
- Hesperhodos** (from the Greek for "western rose") contains *Rosa minutifolia* and *Rosa stellata*, from North America.
- Platyrhodon** (from the Greek for "flaky rose", referring to flaky bark) with one species from east Asia, *Rosa roxburghii* (also known as the chestnut rose).
- Rosa** (the type subgenus, sometimes incorrectly called *Eurosa*) containing all the other roses. This subgenus is subdivided into 11 sections.
 - Banksianae** – white and yellow flowered roses from China.
 - Bracteatae** – three species, two from China and one from India.
 - Caninae** – pink and white flowered species from Asia, Europe and North Africa.
 - Carolinae** – white, pink, and bright pink flowered species all from North America.
 - Chinensis** – white, pink, yellow, red and mixed-color roses from China and Burma.
 - Gallicanae** – pink to crimson and striped flowered roses from western Asia and Europe.
 - Gymnocarpae** – one species in western North America (*Rosa gymnocarpa*), others in east Asia.
 - Laevigatae** – a single white flowered species from China.
 - Pimpinellifoliae** – white, pink, bright yellow, mauve and striped roses from Asia and Europe.

Rose



Rosa rubiginosa

Scientific classification

Kingdom:	Plantae
<i>Clade</i> :	Angiosperms
<i>Clade</i> :	Eudicots
<i>Clade</i> :	Rosids
Order:	Rosales
Family:	Rosaceae
Subfamily:	Rosoideae
Tribe:	Roseae
Genus:	<i>Rosa</i> <p>L.</p>

Species

See List of *Rosa* species

Synonyms

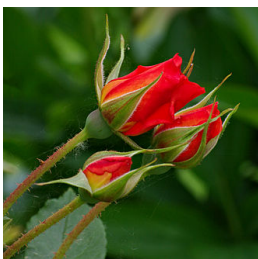
- Hulthemia* Dumort.**
- ×*Hulthemosa* Juz. (*Hulthemia* × *Rosa*)**



Rose leaflets



Longitudinal section through a developing rose hip



Exterior view of rose buds

- **Rosa** (syn. sect. *Cinnamomeae*) – white, pink, lilac, mulberry and red roses from everywhere but North Africa.
- **Synstylae** – white, pink, and crimson flowered roses from all areas.

Uses

Roses are best known as ornamental plants grown for their flowers in the garden and sometimes indoors. They have been also used for commercial perfumery and commercial cut flower crops. Some are used as landscape plants, for hedging and for other utilitarian purposes such as game cover and slope stabilization.

Ornamental plants

The majority of ornamental roses are hybrids that were bred for their flowers. A few, mostly species roses are grown for attractive or scented foliage (such as *Rosa glauca* and *Rosa rubiginosa*), ornamental thorns (such as *Rosa sericea*) or for their showy fruit (such as *Rosa moyesii*).

Ornamental roses have been cultivated for millennia, with the earliest known cultivation known to date from at least 500 BC in Mediterranean countries, Persia, and China.^[5] Many thousands of rose hybrids and cultivars have been bred and selected for garden use as flowering plants. Most are double-flowered with many or all of the stamens having mutated into additional petals.

In the early 19th century the Empress Josephine of France patronized the development of rose breeding at her gardens at Malmaison. As long ago as 1840 a collection numbering over one thousand different cultivars, varieties and species was possible when a rosarium was planted by Loddiges nursery for Abney Park Cemetery, an early Victorian garden cemetery and arboretum in England.

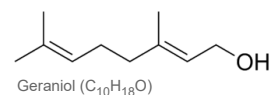
Cut flowers

Roses are a popular crop for both domestic and commercial cut flowers. Generally they are harvested and cut when in bud, and held in refrigerated conditions until ready for display at their point of sale.

In temperate climates, cut roses are often grown in greenhouses, and in warmer countries they may also be grown under cover in order to ensure that the flowers are not damaged by weather and that pest and disease control can be carried out effectively. Significant quantities are grown in some tropical countries, and these are shipped by air to markets across the world.^[6]

Some kind of roses are artificially coloured using dyed water, like rainbow roses.

Perfume



Rose perfumes are made from rose oil (also called attar of roses), which is a mixture of volatile essential oils obtained by steam distilling the crushed petals of roses. An associated product is rose water which is used for cooking, cosmetics, medicine and religious practices. The production technique originated in Persia and then spread through Arabia and India, and more recently into eastern Europe. In Bulgaria, Iran and Germany, damask roses (*Rosa × damascena* 'Trigintipetala') are used. In other parts of the world *Rosa × centifolia* is commonly used. The oil is transparent pale yellow or yellow-grey in colour. 'Rose Absolute' is solvent-extracted with hexane and produces a darker oil, dark yellow to orange in colour. The weight of oil

extracted is about one three-thousandth to one six-thousandth of the weight of the flowers; for example, about two thousand flowers are required to produce one gram of oil.

The main constituents of attar of roses are the fragrant alcohols geraniol and L-citronellol and rose camphor, an odorless solid composed of alkanes, which separates from rose oil.^[7] β-Damascenone is also a significant contributor to the scent.

Food and drink

Rose hips are occasionally made into jam, jelly, marmalade, and soup or are brewed for tea, primarily for their high vitamin C content. They are also pressed and filtered to make rose hip syrup. Rose hips are also used to produce rose hip seed oil, which is used in skin products and some makeup products.^[8]

Rose water has a very distinctive flavour and is used heavily in Middle Eastern, Persian, and South Asian cuisine—especially in sweets such as barfi, baklava, halva, gulab jamun, gumdrops, kanafeh, nougat, and Turkish delight.

Rose petals or flower buds are sometimes used to flavour ordinary tea, or combined with other herbs to make herbal teas.

In France, there is much use of rose syrup, most commonly made from an extract of rose petals. In the Indian subcontinent, Rooh Afza, a concentrated squash made with roses, is popular, as are rose-flavoured frozen desserts such as ice cream and kulfi.^{[9][10]}

Rose flowers are used as food, also usually as flavouring or to add their scent to food.^[11] Other minor uses include candied rose petals.^[12]

Rose creams (rose-flavoured fondant covered in chocolate, often topped with a crystallised rose petal) are a traditional English confectionery widely available from numerous producers in the UK.

Under the American Federal Food, Drug, and Cosmetic Act,^[13] there are only certain *Rosa* species, varieties, and parts are on the Generally Recognized as Safe lists.

- Rose absolute: *Rosa alba* L., *Rosa centifolia* L., *Rosa damascena* Mill., *Rosa gallica* L., and vars. of these spp.
- Rose (otto of roses, attar of roses): Ditto
- Rose buds: Ditto
- Rose flowers: Ditto
- Rose fruit (hips): Ditto
- Rose leaves: *Rosa spp.*^[14]

Medicine

The rose hip, usually from *R. canina*, is used as a minor source of vitamin C. The fruits of many species have significant levels of vitamins and have been used as a food supplement. Many roses have been used in herbal and folk medicines. *Rosa chinensis* has long been used in Chinese traditional medicine. This and other species have been used for stomach problems, and are being investigated for controlling cancer growth.^[15] In pre-modern medicine, diarrhodon (Gr διάρροδον, "compound of roses", from ρόδον, "of roses"^[16]) is a name given to various compounds in which red roses are an ingredient.

Art and symbolism

The long cultural history of the rose has led to it being used often as a symbol. In ancient Greece, the rose was closely associated with the goddess Aphrodite.^{[17][18]} In the *Iliad*, Aphrodite protects the body of Hector using the "immortal oil of the rose"^{[19][17]} and the archaic Greek lyric poet Ibycus praises a beautiful youth saying that Aphrodite nursed him "among rose blossoms".^{[20][17]} The second-century AD Greek travel writer Pausanias associates the rose with the story of Adonis and states that the rose is red because Aphrodite wounded herself on one of its thorns and stained the flower red with her blood.^{[21][17]} Book Eleven of



Rosa gallica Evêque, painted by Redouté



Red roses



Bouquet of pink roses



Rosa canina hips



Rose jam from Iran



Codex Manesse illuminated with roses, illustrated between 1305 and 1340 in Zürich. It contains love songs in Middle High German

the ancient Roman novel *The Golden Ass* by Apuleius contains a scene in which the goddess *Isis*, who is identified with *Venus*, instructs the main character, Lucius, who has been transformed into a donkey, to eat rose petals from a crown of roses worn by a priest as part of a religious procession in order to regain his humanity.^[18]

Following the *Christianization of the Roman Empire*, the rose became identified with the *Virgin Mary*. The color of the rose and the number of roses received has symbolic representation.^[22] ^[23]^[18] The rose symbol eventually led to the creation of the *rosary* and other devotional prayers in Christianity.^[24]^[18]

Ever since the 1400s, the *Franciscans* have had a *Crown Rosary of the Seven Joys of the Blessed Virgin Mary*.^[18] In the 1400s and 1500s, the *Carthusians* promoted the idea of sacred mysteries associated with the rose symbol and rose gardens.^[18] *Albrecht Dürer's* painting *The Feast of the Rosary* (1506) depicts the *Virgin Mary* distributing garlands of roses to her worshippers.^[18]

Roses symbolised the *Houses of York* and *Lancaster* in a conflict known as the Wars of the Roses.

Roses are a favored subject in art and appear in portraits, illustrations, on stamps, as ornaments or as architectural elements. The Luxembourg-born Belgian artist and botanist *Pierre-Joseph Redouté* is known for his detailed watercolours of flowers, particularly roses.

Henri Fantin-Latour was also a prolific painter of still life, particularly flowers including roses. The rose 'Fantin-Latour' was named after the artist.

Other impressionists including *Claude Monet*, *Paul Cézanne* and *Pierre-Auguste Renoir* have paintings of roses among their works.



Gulab jamun made with rose water



The Roses of Heliogabalus by Alma-Tadema (1888)

Pests and diseases

Wild roses are host plants for a number of pests and diseases. Many of these affect other plants, including other genera of the *Rosaceae*.

Cultivated roses are often subject to severe damage from insect, arachnid and fungal pests and diseases. In many cases they cannot be usefully grown without regular treatment to control these problems.

Floral emblem of the United States

In 1986 President *Ronald Reagan* signed legislation to make the rose^[25] the floral emblem of the United States.^[26]

See also

- ADR rose
- List of Award of Garden Merit roses
- List of rose cultivars named after people
- Rose (color)
- Rose garden
- Rose Hall of Fame
- Rose show
- Rose trial grounds

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Framed print after 1908 painting by Henry Payne of the scene in the Temple Garden, where supporters of the rival factions in the Wars of the Roses pick either red or white roses

External links

- World Federation of Rose Societies (http://www.worldrose.org/)
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