

## Malus domestica

Borkh.

Rosaceae

### LOCAL NAMES

English (alma,morris apple,apple tree,cultivated apple,apple)

### BOTANIC DESCRIPTION

*M. domestica* is a small deciduous tree reaching 5-12 m tall with a broad, round, often densely twiggy crown.

Leaves simple, alternate, and ovate with an acute tip, clustered on pubescent spur branches, elliptical, serrate margin, cordate or rounded at base, 3-15 cm long, 2.5-5.5 cm wide, shortly apiculate.

Flowers on spurs in clusters along the fruiting section of the branch, white or pink, 3-4 cm in diameter with five petals; sepals 3-7 mm long, glabrous outside, tomentose on inside; styles glabrous or sparsely villous at base.

Fruits variable in size, color and shape, depending on the variety, with subglabrous skin, wide edible fleshy portion, and a core of 5 carpels, each containing one or more seeds. Seeds brown, obovoid.

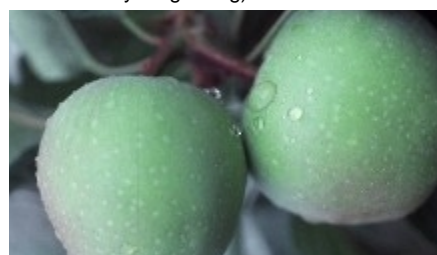
Stems more or less thorny, tomentose or heavily pubescent when young.

### BIOLOGY

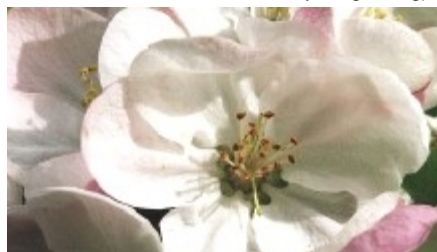
The flowers are hermaphrodite and are pollinated by insects. The flowers are produced in spring with the leaves. The fruit matures in the autumn. Bloom to harvest of fruit takes between 70-170 days.



Fruit(s) (Carl Dennis, Auburn University, [www.forestryimages.org](http://www.forestryimages.org))



Fruit(s) (Jerry A. Payne, USDA Agricultural Research Service, [www.forestryimages.org](http://www.forestryimages.org))



Apples in the ARS germplasm collection at Geneva, New York, vary widely in size, shape, and color (Keith Weller, USDA Agricultural Research Service, [www.forestryimages.org](http://www.forestryimages.org))

**ECOLOGY**

Woodland, sunny edge, dappled shade, boreal moist to boreal wet through tropical dry forest.

**BIOPHYSICAL LIMITS**

Altitude: 0- 3000 m

Temperature: Annual temperature of 5.7-24.2°C (mean of 11.7°C). Apples require a winter dormant period of 900-1,000 hours below 7°C. Without sufficient cold, leaf buds do not open; flower buds do not need as much cold. If they open and leaf buds do not, fruit fails to set.

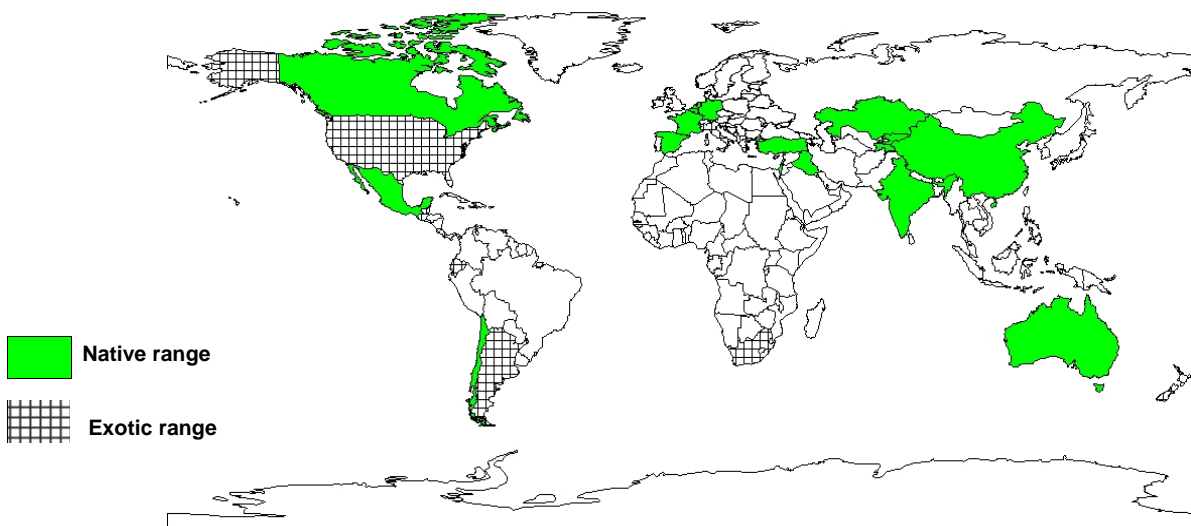
Rainfall: Tolerates 300-1600 mm but rainfall of 600-800 mm is optimal.

Soil type: Apple succeeds in most fertile soils, preferring a moisture retentive well-drained loamy soil. It also grows well in heavy clay soils with a pH range of 4.5-8.2.

**DOCUMENTED SPECIES DISTRIBUTION**

Native: Australia, Belgium, Canada, Chile, China, Dominican Republic, France, Germany, Haiti, India, Iraq, Israel, Kazakhstan, Kyrgyzstan, Mexico, Netherlands, Spain, Tajikistan, Turkey

Exotic: Argentina, Ecuador, Guatemala, Italy, New Zealand, South Africa, United Kingdom, US



The map above shows countries where the species has been planted. It does neither suggest that the species can be planted in every ecological zone within that country, nor that the species can not be planted in other countries than those depicted. Since some tree species are invasive, you need to follow biosafety procedures that apply to your planting site.

**PRODUCTS**

**Food:** Apple fruit can be eaten fresh, cooked or dried for later use, made into jams, jellies, wines, ciders, vinegars, fresh juice, sauces, apple butter, brandies, pies and cakes. They may also be baked, fried, stewed, spiced, candied, or used in mincemeat or chutney; and they can also be dried and eaten or re-constituted (soaked in water, alcohol or some other liquid) for later use. Edible oil can be obtained from the seed.

**Medicine:** Apple is regarded as an aperitif, bacteriocide, carminative, depurative, digestive, diuretic, emollient, hypnotic, laxative, poison, refrigerant, sedative and tonic. It is said to be a remedy for bilious ailments, cancer, catarrh, diabetes, dysentery, diarrhoea, dyspepsia, fever, flux, heart, malaria, scurvy, spasm, thirst, and warts. Its pectin content is also said to protect the body against radiation. Root and bark products are considered to be anthelmintic, hypnotic, and refrigerant. Apple leaves contain an antibacterial substance called phloretin. The apple is also an excellent dentifrice; the mechanical action of eating the fruit serves to clean both the teeth and the gums.

**Lipids:** The oil from the seeds may be used for cooking and illumination.

**Timber:** The wood is hard, compact and fine-grained and is used for turnery, tool handles and canes.

**Fuel:** The wood makes an excellent fuel.

**Fodder or forage:** The fruit is a good wildlife food source, especially for birds and so it's known for attracting wildlife. In excess, however, it can cause respiratory failure and even death.

**Other products:** The fruit is a source of pectin which is used as a culture medium in laboratories.

**TREE MANAGEMENT**

Most apple cultivars are partially self fruiting. Better pollination is assured by having two or more cultivars in close proximity. It is best to use as pollinators those cultivars that bloom at about the same time as the main cultivars.

To ensure a reasonable crop every year, the fruit should be pruned when the tree carries a large crop, since it may produce very little flower the following year if left unpruned.

Spraying for insect pests must never be done during flowering because it kills pollinators. Nor should bee-attractive plants be allowed to establish in the orchard floor if insecticides are used. The latest tool in the organic repertoire is to spray a light coating of kaolin clay, which forms a physical barrier to some pests, and also helps prevent apple sun scald.

Frost during flowering can be very destructive. Snow overburdens and often breaks trees. Sites for orchards should be sufficiently elevated to allow cold air to settle below rather than in the orchard. Sites above large bodies of water are particularly good. Ridge tops are not satisfactory because exposure to heavy winds can cause damage to trees and fruits.

**GERMPLASM MANAGEMENT**

Stored seed requires stratification for 3 months at 1°C and should be sown in a cold frame as soon as it is received. It might not germinate for 12 months or more. Once pricked out into individual pots they should be protected from cold in their first winter otherwise, kept in pots in a cold frame and planted out in late spring of the following year.

**PESTS AND DISEASES**

Among the most serious disease problems are fireblight, a bacterial disease; and Gymnosporangium rust, apple scab, and black spot, fungal diseases. In poorly drained areas there could occur diseases such as canker.

The plum curculio is the most serious insect pest. Others include Apple maggot and codling moth. A large number of lepidoptera spp larvae depend on Malus spp as food plants.

**FURTHER READING**

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**SUGGESTED CITATION**

Orwa C, Mutua A, Kindt R, Jamnadass R, Simons A. 2009. Agroforestry Database: a tree reference and selection guide version 4.0 (<http://www.worldagroforestry.org/af/treedb/>)