

Sorbus domestica in Europe: distribution, habitat, usage and threats

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Sorbus domestica L. (service tree) is a wild fruit tree. Its apple-like fruit are used for a range of culinary and medicinal purposes. Although it can tolerate a fairly wide range of climatic and soil conditions, it is unable to stand competition and is usually found as isolated trees. Originally cultivated by the Romans, it is now rare throughout its natural range and is subject to several conservation and breeding programs.

Service tree (*Sorbus domestica* L.) is a deciduous tree, usually reaching around 20m in height, although it can grow much larger in favourable sites¹. Leaves are **imparipinnate** with 13-21 leaflets. The bark is dark in colour with fine rectangular fissures². Small white flowers appear from late April to mid-May. The edible fruits are apple or pear-shaped, 2-3 cm in diameter³. Fruit usually contains 2-5 (up to 10) seeds³. Although the seeds are well dispersed by birds and mammals, the regeneration rate from seeds is low, and the tree also frequently regenerates by root suckers¹. It is long-lived and often reaches 200 years of age, occasionally up to 400 or more³.

Distribution

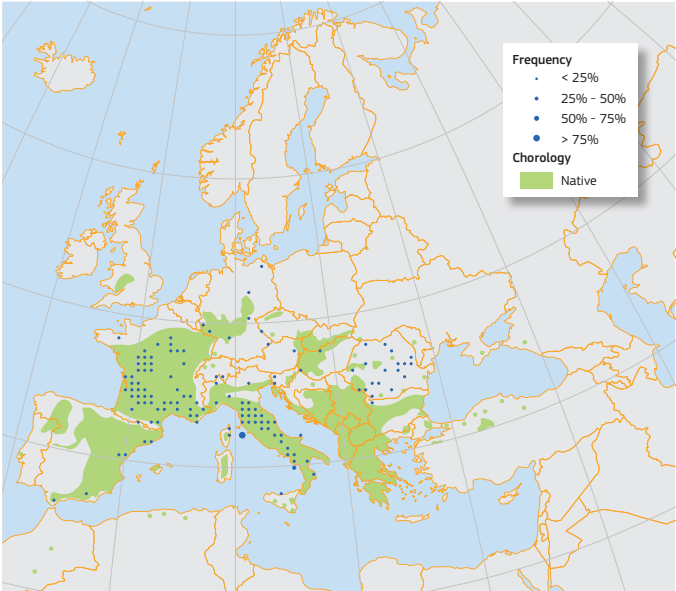
Service tree is distributed through central and southern Europe in particular in the Balkan peninsula, Italy and southern France, and rarely in parts of North Africa and western Asia¹. At its northern limit there are a few scattered individuals in Wales and central England, although it is thought that these are probably descended from cultivated trees⁴. Nowadays, it is unclear how much of its distribution range is natural, since this species has been spread through cultivation since Roman times¹. However, it is rare throughout its range⁵ and endangered in many parts³.

Habitat and Ecology

Service tree prefers warm and mild climates, although it is also resistant to cold down to -25°C to -30°C and can withstand late frosts^{6,7}. It is able to grow on dry sites and cope with drought during the vegetation period^{6,8}, requiring a minimum rainfall of 500mm per year⁷. It can be found up to 650m on south-facing slopes in central Europe, but can grow at higher elevations further south⁷. It is tolerant to a variety of soil conditions, but prefers moderately acid or neutral soils⁶. It can also be found in coppice and former coppice forests as a result of historic cultivation⁶. It is a very light demanding species that can tolerate shade only in its first few years. This makes it a weak competitor, unable to dominate when crown closure occurs⁶. Under conditions of a warming climate it may become more favoured in some sites as a result of its drought tolerance, but its scarcity is likely to limit any range movement⁸.



Traditional fruit press used in Germany. The juice of apples is often mixed with service tree fruits and fermented obtaining the Apfelwein, the wine of apple. (Copyright Shankar S., www.flickr.com: CC-BY)



Map 1: Plot distribution and simplified chorology map for *Sorbus domestica*. Frequency of *Sorbus domestica* occurrences within the field observations as reported by the National Forest Inventories. The chorology of the native spatial range for *S. domestica* is derived after EUFORGEN¹².

Importance and Usage

Service tree can be used for ornamental purposes, wood and fruit production³. The fruits can be eaten when bletted (over-ripe), or are used to produce marmalades, jams, jellies, juices, fruit wine or other alcoholic drinks^{1,3,9}. It is also used in traditional medicine against intestinal problems, dysentery, diabetes and for memory improvement^{1,3,10}. The hard and heavy wood is of good quality and can command a high price; it is often used for making small objects such as screws, gear teeth, bearings and rifle butts^{1,3}.

Threats and Diseases

Diseases of apple, such as European canker of apple (*Nectria galligen*) and apple scab (*Venturia inaequalis*) can affect the service tree and cause premature leaf fall⁸. Across Europe, the species is very rare and its genetic diversity is threatened mainly due to the reduction in number of individuals and disturbance of the natural populations by human activities^{6,11}.



Dark brown bark with rectangular fissures. (Copyright Michael Kranewitter, commons.wikimedia.org: CC-BY)



Hermaphrodite white flowers with 5 petals, 5 styles and numerous stamens. (Copyright Franco Rossi, www.actaplantarum.org: AP)



The small white flowers appear in the spring and are insect pollinated. (Copyright Franco Rossi, www.actaplantarum.org: AP)



The fruits are used for a wide variety of culinary purposes. (Copyright Mihai Enescu: CC-BY)

References

[1] P. Rotach, *EUFORGEN Technical guidelines for genetic conservation and use for Service tree Sorbus domestica* (2003).
[2] A. F. Mitchell, P. Dahlstrom, E. Sunesen, C. Darter, *A field guide to the trees of Britain and northern Europe* (Collins, 1974).
[3] C. Bignami, *Conservation, evaluation, exploitation and collection of minor fruit tree species: EC Project GENRES 29*, E. Bellini, E. Giordani, eds. (Horticulture Department, University of Florence, 1999).
[4] M. Hampton, *Watsonia* **20**, 379 (1995).
[5] B. Demesure, *Noble Hardwoods Network: Report of the Second Meeting, 22-25 March 1997, Lourizan, Spain*, J. Turok, et al., eds. (Rome, Italy, 1997), pp. 48-50.
[6] V. Paganová, *Journal of Forest Science* **54**, 216 (2008).
[7] P. Gonin, et al., *Autoecology of broadleaved species* (2013).
[8] G. E. Hemery, et al., *Forestry* **83**, 65 (2010).
[9] O. Vyviurska, S. Pysarevska, N. Jánošková, I. Špáňik, *Open Chemistry* **13** (2015).
[10] A. Termentzi, P. Alexiou, V. J. Demopoulos, E. Kokkalou, *Pharmazie* **63**, 693 (2008).
[11] J. Müllerová, R. Hédli, P. Szabó, *Forest Ecology and Management* **343**, 88 (2015).
[12] EUFORGEN, *Distribution map of service tree (Sorbus domestica)* (2014). www.euforgen.org.

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Please, cite as:
Enescu, C. M., de Rigo, D., Houston Durrant, T., Caudullo, G., 2016. **Sorbus domestica in Europe: distribution, habitat, usage and threats**. In: San-Miguel-Ayanz, J., de Rigo, D., Caudullo, G., Houston Durrant, T., Mauri, A. (Eds.), *European Atlas of Forest Tree Species*. Publ. Off. EU, Luxembourg, pp. e019db5+