

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

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The wild service tree (*Sorbus torminalis* (L.) Crantz) is a fast-growing, light-demanding, clonally resprouting forest tree of disturbed forest patches and forest edges. It is widely distributed in southern, western and central Europe, but is a weak competitor that rarely dominates forests and never occurs in pure stands. The wild service tree is able to tolerate low winter temperatures, spring frosts, and summer droughts of up to two months. The species often grows in dry-warm and sparse forest habitats of low productivity and on steep slopes. It produces a hard and heavy, durable wood of high economic value.

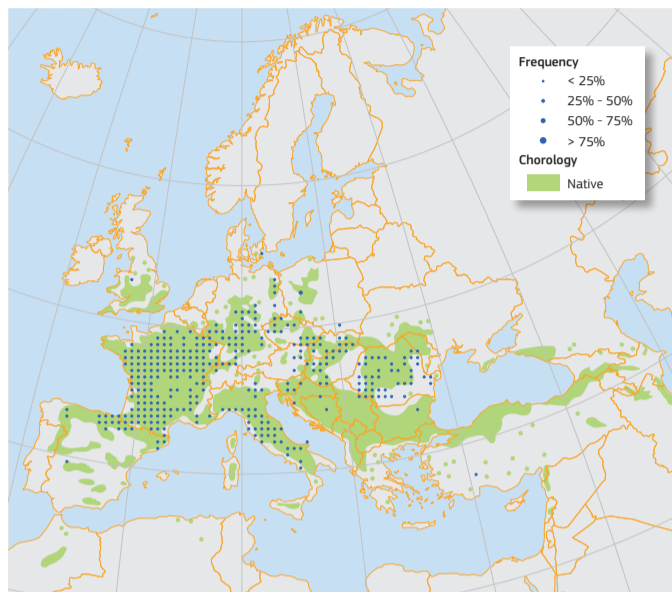
The wild service tree (*Sorbus torminalis* (L.) Crantz) is a medium-sized, fast-growing deciduous tree that usually grows up to 15-25m with average diameters of 0.6-0.9 m, exceptionally to 1.4m¹⁻³. The mature tree is usually single-stemmed with a distinctive ash-grey and scaly bark that often peels away in rectangular strips. The shiny dark green leaves are typically 10x7cm and have five to nine spreading, acute lobes. This species is **monoecious hermaphrodite**, flowers are white, insect pollinated, and arranged in **corymbs** of 20-30 flowers. The tree has an average life span of around 100-200 years; the maximum is given as 300-400 years¹⁻³. Individuals start fruiting typically at 15-20 years of age, abundantly and frequently, with seed years every 2-3 years⁴. The fruits are small **pomes**, 10-15mm in diameter, spotted with green to russet or brown colour, and are dispersed by birds or **frugivorous** mammals¹⁻³. Seeds are light brown, of ovate shape with an approximate size of 2-6mm^{1, 5, 6}.

Distribution

The wild service tree is a sub-Mediterranean species and occurs across western, central and southern Europe, but also in mountains of north-western Africa and south-western Asia. Current abundance centres seem to be located in France and in the Balkan region². Upper limits are located at 500m in Germany and 700m in the Swiss Mittelland³. On south-facing slopes of the Jura Mountains and in valleys in the Alp the species occurs up to 900m. In the Atlas Mountains it has its centre of distribution between 1300-1800m. The highest occurrence in elevation is reported from Anatolia (Lake Van) at 2200m¹.

Habitat and Ecology

This species tolerates harsh winter conditions and is quite insensitive to late frosts: it withstands temperatures down to -5 °C in April⁷. In increasingly drier regions like in southern Europe, the wild service tree is a mountain forest species. A certain amount of warmth is necessary during the growing season; therefore the



Map 1: Plot distribution and simplified chorology map for *Sorbus torminalis*. Frequency of *Sorbus torminalis* occurrences within the field observations as reported by the National Forest Inventories. The chorology of the native spatial range for *S. torminalis* is derived after EUFORGEN¹³.

species is getting increasingly scarce in mountain areas towards the north of the distribution range, and is rather uncommon in cool habitats like north-facing slopes or cold valley bottoms⁷. The same lack of summer warmth limits the general vertical distribution. The optimum mean annual temperature is between 10 ° and 17 °C; minimum annual rainfall is about 500mm, while the optimum lies between 700 and 1500mm³. The wild service tree is a shade intolerant, post-pioneer (nomadic) species, requiring free-growth for optimal crown development. It is a minor component of woodlands-types dominated by various oaks and less frequently pine or beech, where it is found as single trees or in small groups, and population densities are generally very low².



Yellow and red-brown leaves in autumn. (Copyright Ashley Basil, www.flickr.com: CC-BY)

Due to efficient seed dispersal by birds and small mammals, and the ability to spread vegetatively by root suckers, the species can easily colonise appropriate sites, such as larger gaps, clearings, low-density forests and abandoned agricultural land surrounded by forests, thus remaining permanently present in the landscape⁸. Regarding soil characteristics it is a very tolerant species that can grow on both acid and basic soils (from clay to limestone), with a pH ranging from 3.5 to 8 and humus types from dismoder to carbonate mull². It avoids both dry sandy soils and wet or marshy soils and reaches its best growth on warm-dry limestone soils^{1, 2}.



Grey-brown bark of young tree with lenticels, it becomes fissured into scaly plates when mature. (Copyright Kenraiz, commons.wikimedia.org: PD)



Flowers are arranged in corymbs of 20-30 individual blossoms. (Copyright Emma Silvana Mauri: CC-BY)



Scented white hermaphrodite flowers: they are insect pollinated. (Copyright Sergio Piccolo, www.actaplantarum.org: AP)

Importance and Usage

The wild service tree is one of the most valuable hardwoods in Europe. The wood is fine-grained, very dense and has good bending strength. In earlier times it was used to make screws for winepresses, billiard queue sticks, musical instruments and turnery. Today, it is mainly used for decorative veneers. Quantitatively, the wild service tree wood is of low importance for the European wood market since only several thousands of cubic metres are harvested yearly².



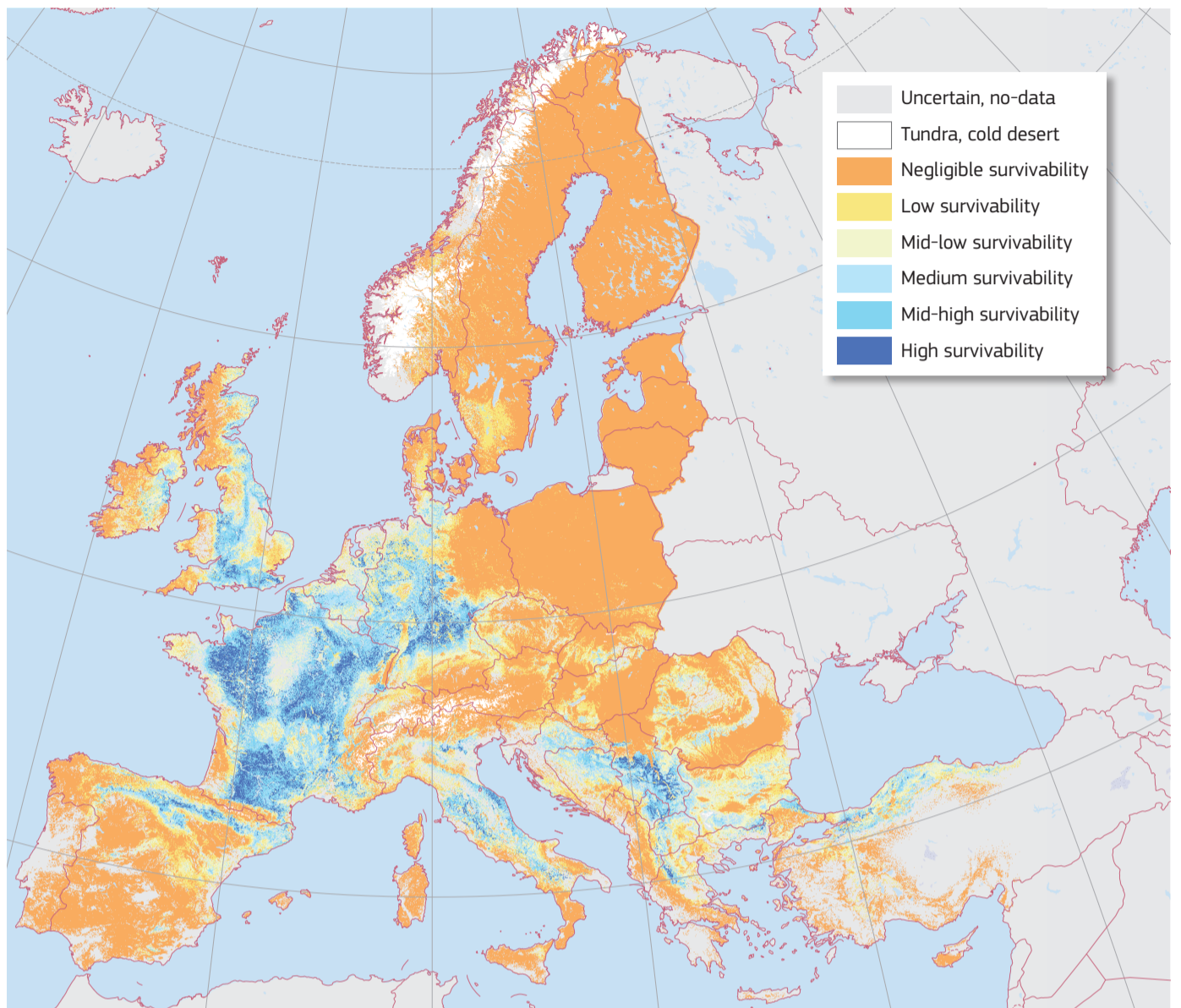
Apples affected by the disease *Venturia inaequalis*; this Ascomycete fungus can affect also wild service tree. (Copyright Jan Homann, commons.wikimedia.org: PD)

Threats and Diseases

Older trees of the wild service tree can reach a root-depth of 1-2 m, rendering it quite resistant to wind-throw⁹. Young trees are especially susceptible to browsing by deer and other



Maturing reddish fruits: these small pomes are edible and very astringent until over-ripe (bletted). (Copyright Emma Silvana Mauri: CC-BY)



Map 3: High resolution map estimating the maximum habitat suitability.

ungulates. Among invertebrate consumers, only generalist herbivore arthropods are known. On the leaves of the wild service tree three damaging factors are frequently recorded: leaf scab (*Venturia inaequalis*), leaf aphids and gall mites (*Eriophyes* spp.)³. The tree is a wild host for the apple aphid (*Aphis pomi*)^{10, 11}. A serious threat to older stems is the honey fungus (*Armillaria* spp.), whose parasitic infestation can lead to lethal damage¹².

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Fruits start to develop in summer. (Forestry Commission, www.forestry.gov.uk: © Crown Copyright)

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