

Quercus cerris in Europe: distribution, habitat, usage and threats

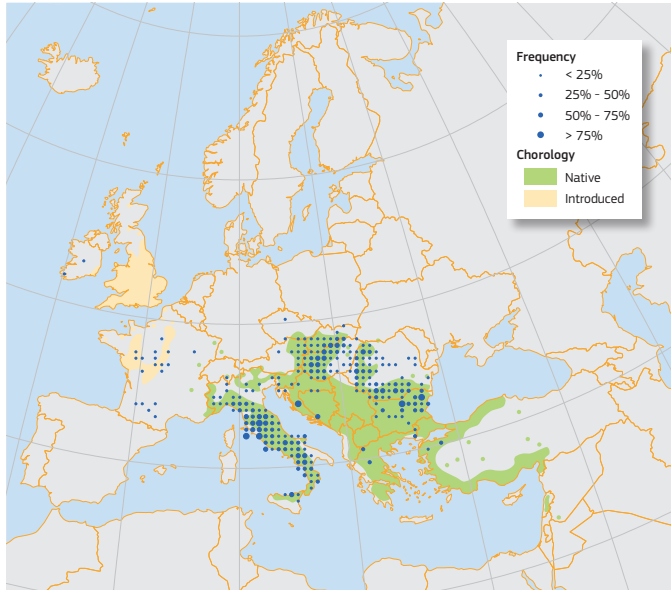
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Turkey oak (*Quercus cerris* L.) is a deciduous tree native to southern Europe and Asia Minor, and a dominant species in the mixed forests of the Mediterranean basin. Turkey oak is a representative of section *Cerris*, a particular section within the genus *Quercus* which includes species for which the maturation of acorns occurs in the second year.

Quercus cerris L., commonly known as Turkey oak, is a large fast-growing deciduous tree species growing to 40m tall with a trunk up to 1.5-2m diameter¹, with a well-developed root system². It can live for around 120-150 years³. The bark is mauve-grey and deeply furrowed with reddish-brown or orange bark fissures^{4, 5}. Compared with other common oak species, e.g. sessile oak (*Quercus petraea*) and pedunculate oak (*Quercus robur*), the wood is inferior, and only useful for rough work such as shuttering or fuelwood¹. The leaves are dark green above and grey-felted underneath⁶; they are variable in size and shape but are normally 9-12cm long and 3-5cm wide, with 7-9 pairs of triangular lobes⁶. The leaves turn yellow to gold in late autumn and drop off or persist in the crown until the next spring, especially on young trees³. The twigs are long and **pubescent**, grey or olive-green, with **lenticels**. The buds, which are concentrated on the tip of the twigs, are egg-shaped and hairy and, typically, they are surrounded by long twisted whiskers⁶. The flowers are **monoecious** and wind-pollinated, appearing in April-May. The fruit is a large acorn stalkless, 2-3.5(5)cm long and 2cm broad. The acorn cup is densely covered with bristles⁵. Turkey oak acorns mature over a two year period, but the acorn crop is abundant and it germinates readily and can be easily propagated^{1, 3, 7}.

Distribution

The range of this species extends from southern Europe to Asia Minor³. Across its distribution range, it is particularly present in the Balkan and Italian Peninsulas³. The western limit of its natural range is France and its northern limit is in Germany, continuing eastward through Austria, Switzerland, eastern Czech Republic, Slovakia and Hungary³. It is one of 12 native oak species in Albania. In Bulgaria it occupies drier and moderately rich habitats in the plain and hilly regions⁸, where it forms large forests with other oak species (e.g. *Quercus frainetto*, *Quercus pubescens*) and other mixed broadleaves including field maple (*Acer campestre*), elm (*Ulmus minor*) Oriental hornbeam (*Carpinus orientalis*) and manna ash (*Fraxinus ornus*)⁹. It is also important in Hungary, where it forms over 11% of the forested area in the country¹⁰. In Italy, it grows from sea level up to the



Map 1: Plot distribution and simplified chorology map for *Quercus cerris*. Frequency of *Quercus cerris* occurrences within the field observations as reported by the National Forest Inventories. The chorology of the native spatial range for *Q. cerris* is derived after Meusel and Jager, and Jalas and Suominen^{25, 26}.

Apennines and covers around 280 000 ha over the peninsula, frequently occurring together with Hungarian oak (*Q. frainetto*)⁹. It is also widely distributed in Slovenia, most frequently in the sub-mediterranean regions of Kras, Brkini and Tolminsko, but it also grows on warm and dry steep slopes in the continental parts of the country⁹. In the case of a warming climate, the species is expected to show a range shift North¹¹. Turkey oak has been introduced in some other European countries including the UK and France³, and it is also planted in North America⁴, Ukraine, Argentina and New Zealand³.

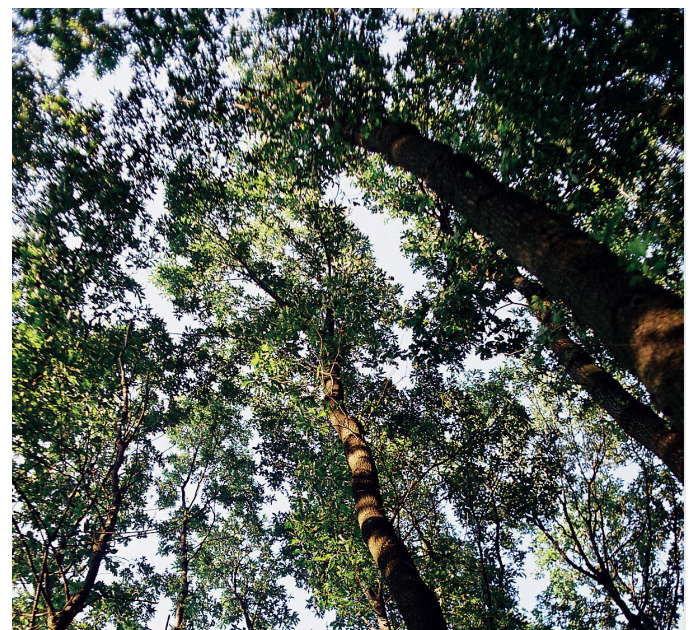
Habitat and Ecology

Turkey oak has a good adaptability to a variety of different site conditions. It is relatively tolerant to drought (more than the other oak species of the same region)^{3, 12}, air pollution^{9, 13} and



Large shade tree in agricultural area near Altamura (Bari, South Italy). (Copyright Vito Buono, www.actaplantarum.org: AP)

can grow in a wide range of soil types including weakly acid¹⁴, pseudogley¹², or even shallow calcareous soils, as long as they are not too dry¹. When established it develops a taproot and deep lateral root branches, helping it to remain windfirm³. It is light-demanding but can grow under a light woodland canopy¹. It has many pioneer characteristics, including good germination rates of seeds and fast early growth. It also has a high resprouting capacity, making it particularly suitable for coppicing and pollarding³.



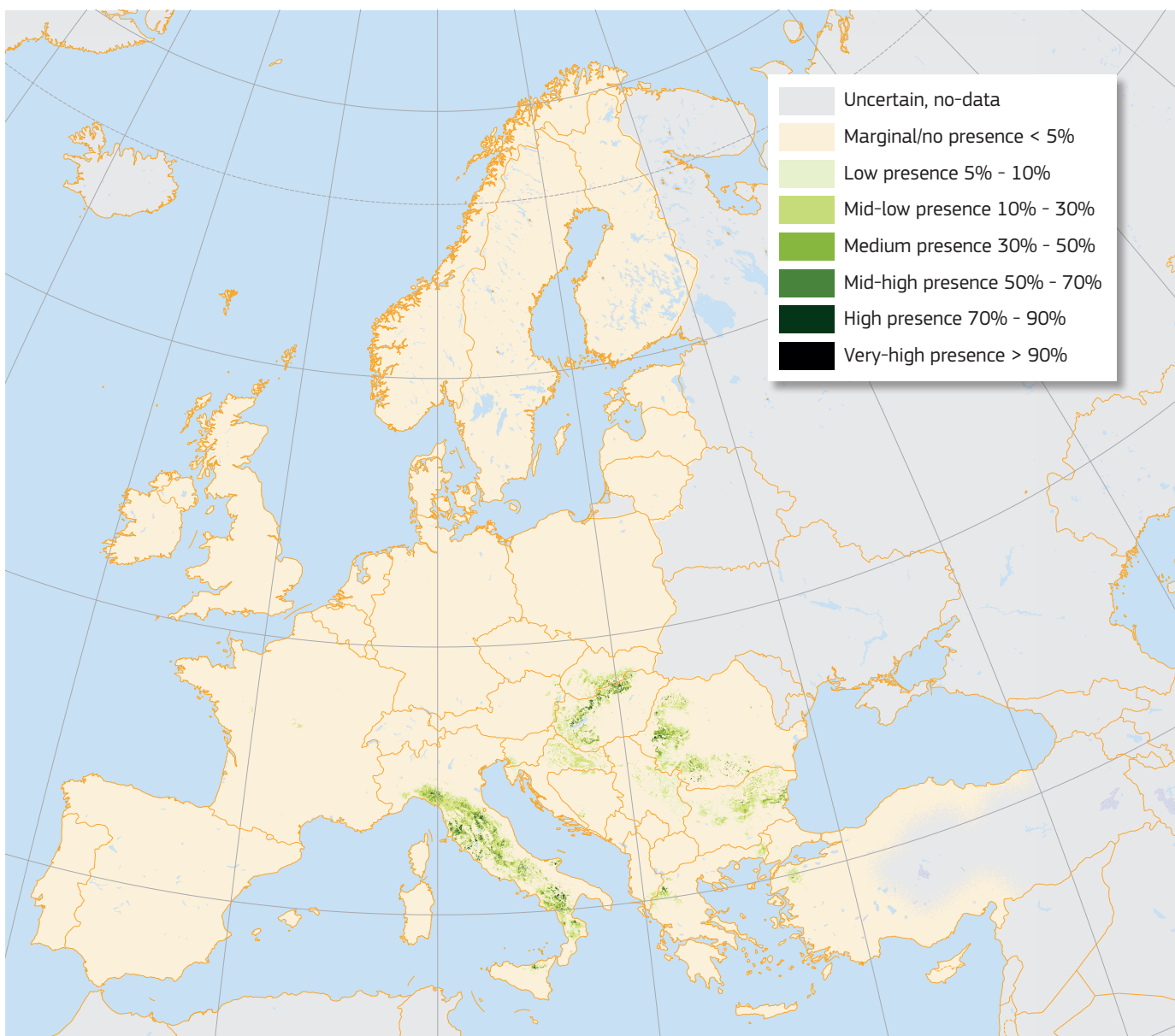
Forest dominated by Turkey oak in the Košutnjak Forest Park near Belgrade (Slovenia). (Copyright Stefanst, commons.wikimedia.org: PD)

Importance and Usage

The wood of Turkey oak has relatively few uses due to its tendency to crack and its lower technological quality¹. It is frequently used as firewood, having almost the same calorific value as hornbeam or beech^{12, 15}. In past years the wood was used for railway sleepers⁹, and it is still used for timber production



Dark-green leaves with 7-9 pairs of lobes. (Copyright Enrico Romani, www.actaplantarum.org: AP)



Map 2: High resolution distribution map estimating the relative probability of presence.

in the eastern part of its range, where the wood quality is at its best³. It has a useful role in soil conservation, erosion control and reforestation of bare soils because of its ability to establish and grow quickly in a range of soil types³. Turkey oak is also often planted in urban areas as an ornamental tree as it is an attractive and well-formed tree^{1, 3}. The acorns and young coppice shoots represent an important source of food for animals in Mediterranean agro-silvopastoral systems³. It is used in traditional Mediterranean medicine for numerous purposes, including anti-infective treatments, and there is some evidence that it could be used against the pathogen *Staphylococcus aureus*¹⁶.



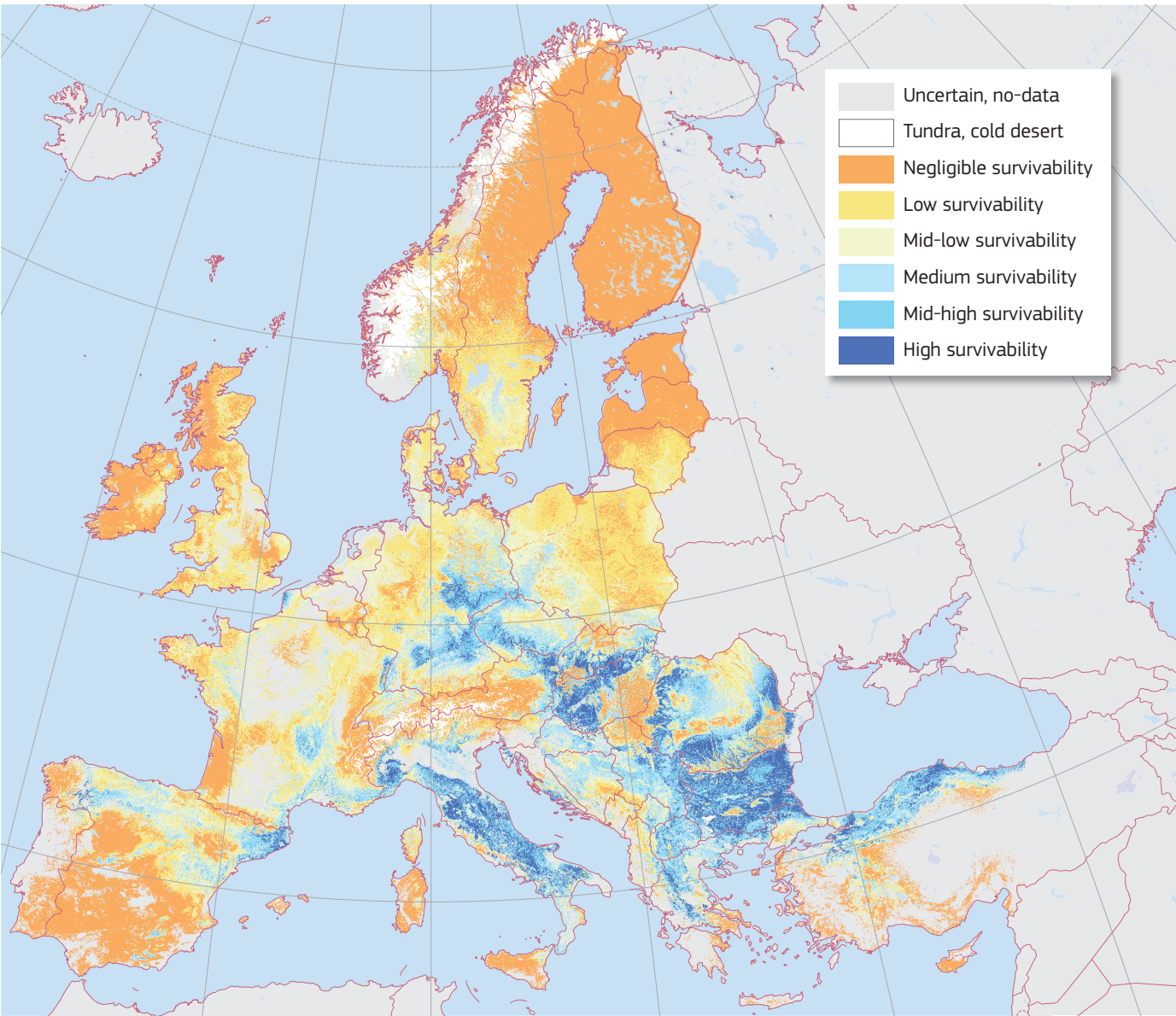
Red female flower with fleshy stigmas blossoming with new leaves in spring. (Copyright Graziano Propetto, www.actaplantarum.org: AP)

Threats and Diseases

The fungi *Discula quercina*, *Hipparion mediterraneum* and *Biscogniauxia mediterranea* have been reported to cause potentially severe infections to Turkey oak trees¹⁷⁻²⁰. *Hypoxylon mediterraneum* can contribute to oak decline in drought-stressed trees²¹. The gypsy moth *Lymantria dispar* is one of the most important leaf-chewing insects, attacking summer foliage³. Turkey oak is one of the alternate hosts of the knopper gall wasp *Andricus quercuscalicis*, which then goes on to infect pedunculate oaks in the next part of its life cycle^{1, 22}. The gall aphid *Phylloxera quercus* is also damaging in many European countries³. Turkey oak is vulnerable to root pathogens of the genus *Phytophthora*



Leaf gall caused by the wasp (*Andricus quercuscalicis*) on pedunculate oak (*Quercus robur*); Turkey oak is the alternate host completing the life cycle of this wasp. (Copyright Somepics, commons.wikimedia.org: CCO)



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

(*P. cinnamomi*, *P. ramorum*)²³. Furthermore, it is moderately susceptible to *Cryphonectria parasitica*²³. In urban areas the oak processionary moth *Traumatocampa processionea* may affect trees planted in green spaces²⁴. A number of bark beetle species can cause economic damage by creating galleries in the timber³.



Stalkless acorns with cup covered by bristles. (Copyright Graziano Propetto, www.actaplantarum.org: AP)



Grey bark with long fissures showing pinkish-orange colours in the cracks. (Copyright Stefano Zerauscheck, www.flickr.com: AP)

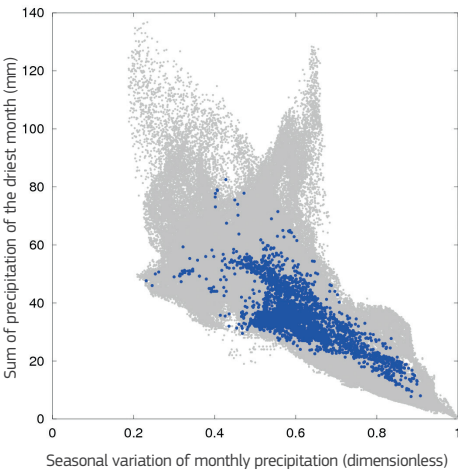
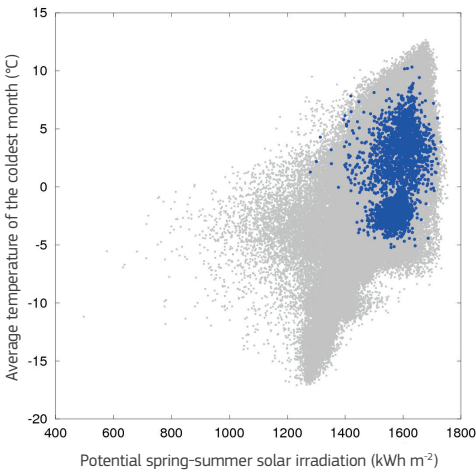
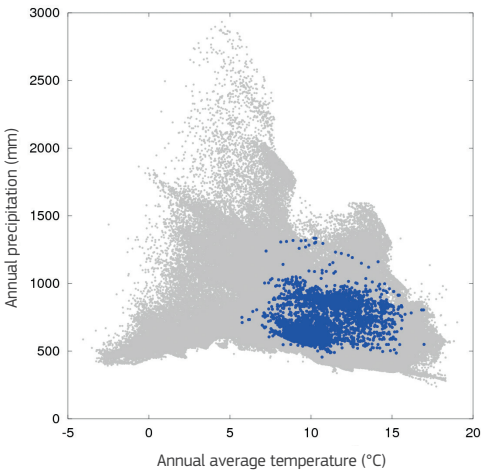
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Field data in Europe (including absences) ●

Observed presences in Europe ●

Autoecology diagrams based on harmonised field observations from forest plots.



This is an extended summary of the chapter. The full version of this chapter (revised and peer-reviewed) will be published online at <https://w3id.org/mtv/FISE-Comm/v01/e01b479>. The purpose of this summary is to provide an accessible dissemination of the related main topics. This QR code points to the full online version, where the most updated content may be freely accessed. Please, cite as: de Rigo, D., Enescu, C. M., Houston Durrant, T., Caudullo, G., 2016. *Quercus cerris* 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. e01b479+

