Quercus cerris

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

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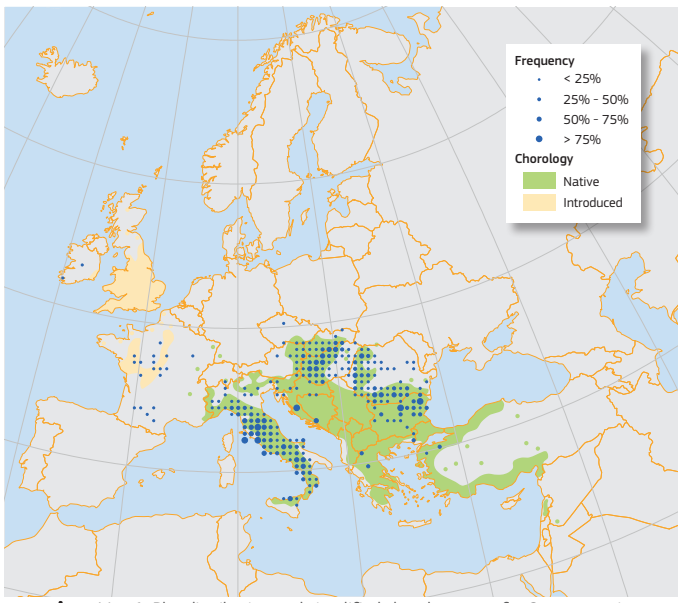
Turkey oak (*Quercus cerris* L.) is a deciduous tree native to southern Europe and Asia Minor, and a dominant species in the mixed forests of the Mediterranean basin. Turkey oak is a representative of section *Cerris*, a particular section within the genus *Quercus* which includes species for which the 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 40 m tall with a trunk up to 1.5-2 m diameter[1], with a well-developed root system[2]. It can live for around 120-150 years[3]. 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 fuelwood[1]. The leaves are dark green above and grey-felted underneath[6]; they are variable in size and shape but are normally 9-12 cm long and 3-5 cm wide, with 7-9 pairs of triangular lobes[6]. The leaves turn yellow to gold in late autumn and drop off or persist in the crown until the next spring, especially on young trees[3]. 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 whiskers[6]. 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 2 cm broad. The acorn cup is densely covered with bristles[5]. 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].



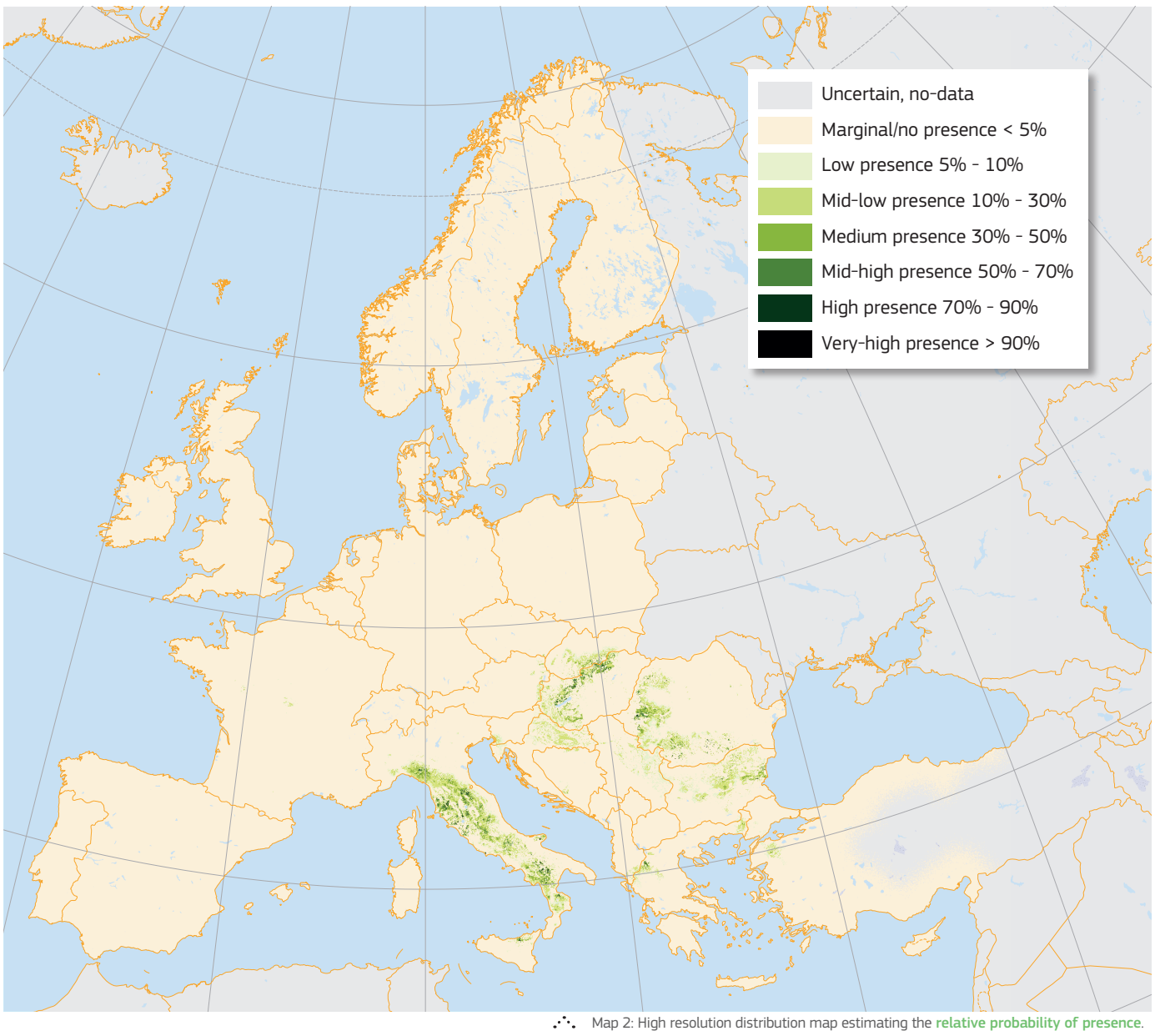
Map 1: Plot distribution and simplified chorology map for *Quercus cerris*. Frequency of *Quercus cerris* occurrences within the field observations as reported by the National Forest Inventories. The chorology of the native spatial range for *Q. cerris* is derived after Meusel and Jager; and Jalas and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

Distribution

The range of this species extends from southern Europe to Asia Minor[3]. Across its distribution range, it is particularly present in the Balkan and Italian Peninsulas[3]. 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 Hungary[3]. It is one of 12 native oak species in Albania. In Bulgaria it occupies drier and moderately rich habitats in the plain and hilly regions[8], 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 country[10]. In Italy, it grows from sea level up to the 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 country[9]. In the case of a warming climate, the species is expected to show a range shift North[11]. Turkey oak has been introduced in some other European countries including the UK and France[3], and it is also planted in North America[4], Ukraine, Argentina and New Zealand[3].

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



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

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 acid[14], pseudogley[12], or even shallow calcareous soils, as long as they are not too dry[1]. When established it devlops a taproot and deep lateral root branches, helping it to remain windfirm[3]. It is light-demanding but can grow under a light woodland canopy[1]. 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 pollarding[3].

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 quality[1]. 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 sleepers[9], and it is still used for timber production

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

in the eastern part of its range, where the wood quality is at its best[3]. 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 types[3]. 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 systems[3]. 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.
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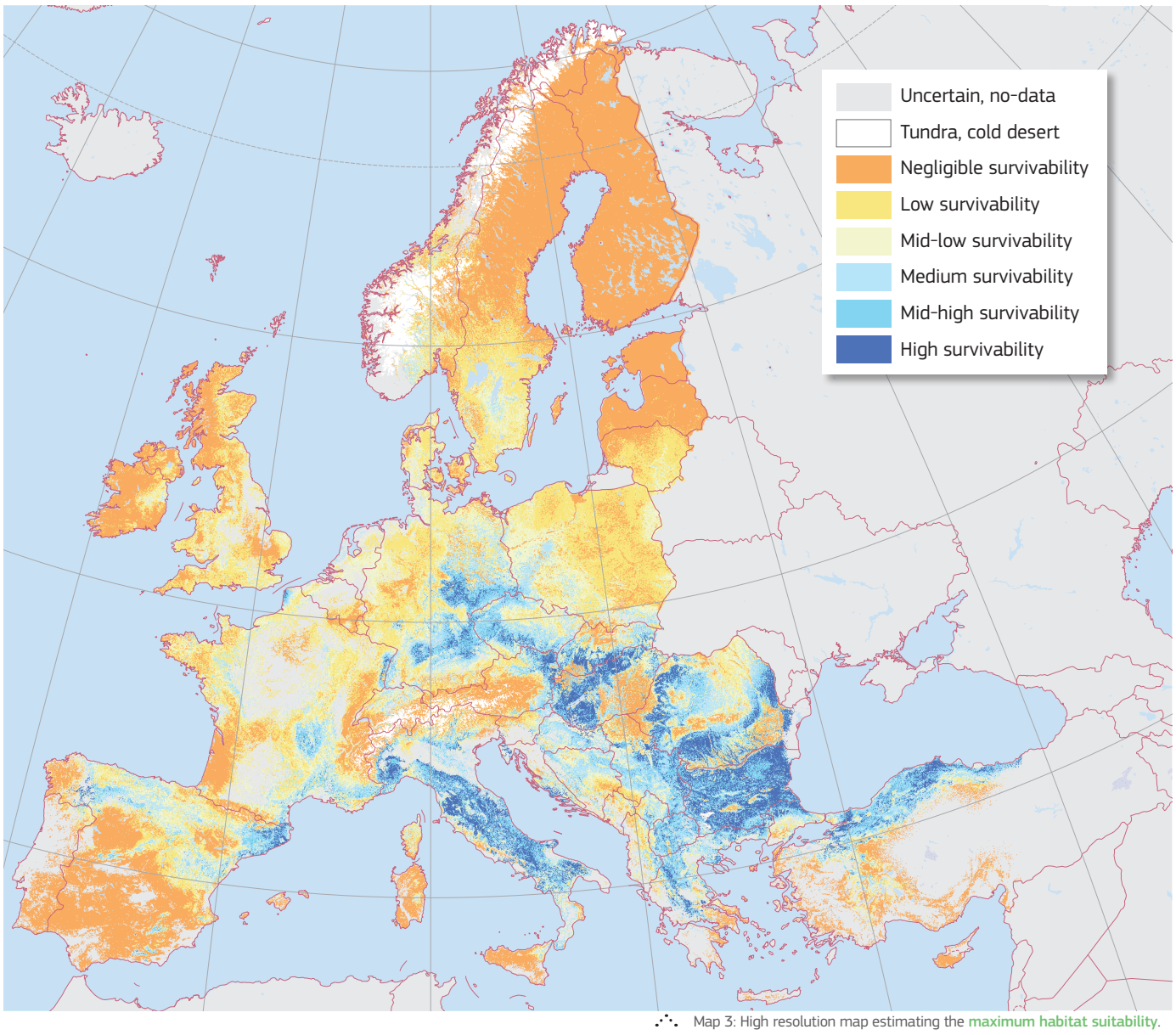

Map 3: High resolution map estimating the **maximum habitat suitability**.

Threats and Diseases

The fungi *Discula quercina*, *Hipparion mediterraneum* and *Biscogniauxia mediterranea* have been reported to cause potentially severe infections to Turkey oak trees[17-20]. *Hypoxylon mediterraneum* can contribute to oak decline in drought-stressed trees[21]. The gypsy moth *Lymantria dispar* is one of the most important leaf-chewing insects, attacking summer foliage[3]. 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 countries[3]. Turkey oak is vulnerable to root pathogens of the genus *Phytophthora* (*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 spaces[24]. A number of bark beetle species can cause economic damage by creating galleries in the timber[3].

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.
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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.
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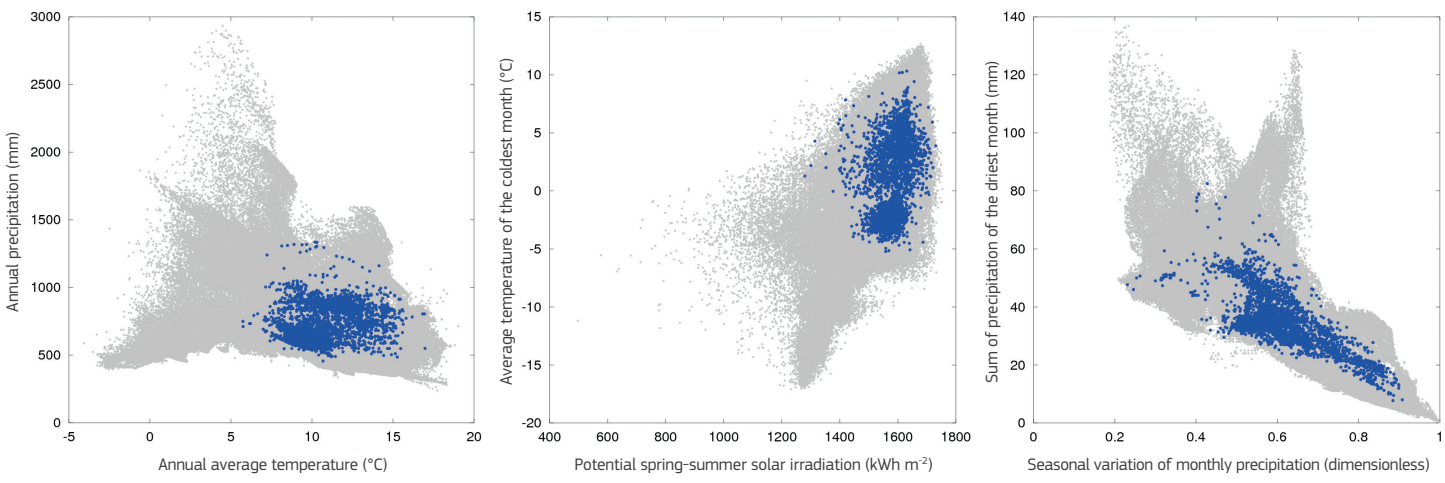
Field data in Europe (including absences) ● Observed presences in Europe ●

Autoecology diagrams based on harmonised **field observations** from **forest plots**.



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