

## Quercus frainetto in Europe: distribution, habitat, usage and threats

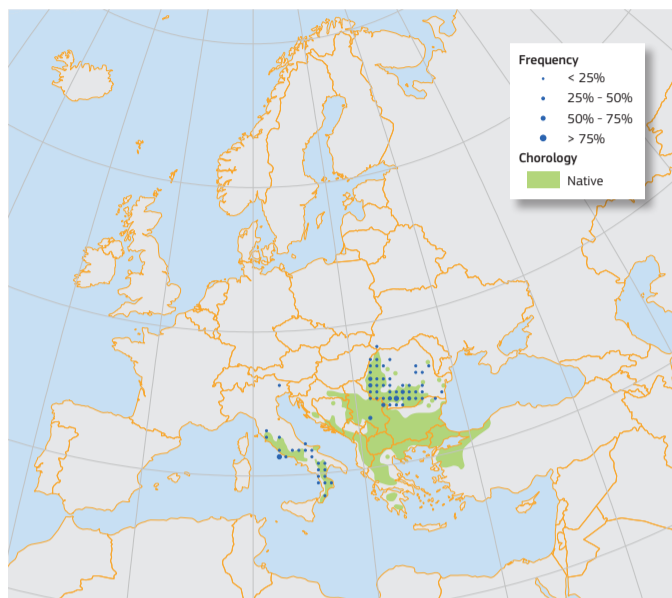
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*Quercus frainetto* is a species native to Balkan Peninsula, and also present in South Italy and North-West Turkey. Despite being also known as Hungarian oak, its presence in Hungary is sporadic and mainly resulting from previous introduction. This oak is an element of the sub-Mediterranean flora, and is usually associated in mixed groups (as well as hybrids) with other oak species across its distribution range. It has been traditionally managed in coppiced forests for firewood and timber production in combination with livestock grazing. As other oaks, it is suffering a period of decline, due to climate change and human pressure although its future distribution is predicted to expand in response to expected warming.

Hungarian oak (*Quercus frainetto* Ten.) is a large deciduous tree, reaching heights of more than 30 m tall and very rarely living more than 200 years<sup>1</sup>. The trunk is slender, similar to sessile oak. The twigs are covered with hairs. The leaves are large and distinctive: up to 25 cm long, widest close to the apex, with many deep-cut lobes (more than any other oaks<sup>2</sup>). The base of the leaf is usually ear-like and in some cases overlaps the petiole. On the lower surface, the leaves are covered with dense hairs. The buds are large, brown in colour and hairy. The flowers are **monoecious**



Dark grey bark formed by small plates.  
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Map 1: Plot distribution and simplified chorology map for *Quercus frainetto*. Frequency of *Quercus frainetto* occurrences within the field observations as reported by the National Forest Inventories. The chorology of the native spatial range for *Q. frainetto* is derived after Meusel and Jäger<sup>10</sup>.

(individual flowers are either male or female, but both sexes can be found on the same plant) and are wind-pollinated. The acorns are up to 25 mm long and egg shaped. In common with other oak species it has high fructification rates that occur around every 5-8 years<sup>3, 4</sup>. The acorn cup is **sessile** and covered with long overlapping scales and hairs<sup>5, 6</sup>.

### Distribution

Paleoecological evidence suggests that Hungarian oak was already present in the Peloponnese more than 6000 years ago<sup>7</sup>. It is indeed considered native to south-eastern Europe<sup>8</sup> as an element of the sub-Mediterranean flora<sup>9</sup>, with its widest distribution in



Leaves are the most deeply lobed of the oak species: here just starting to show autumn colours.  
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the Balkan Peninsula. Despite its name, this oak is not native to Hungary, although it is present sporadically as an introduced species<sup>8</sup>. It is also present in north-west Turkey and southern Italy<sup>10</sup> in form of scattered patches along the pre-Apennine ridges<sup>11, 12</sup>. As a response to future expected warming its future distribution is predicted to expand in Spain, France and Northern Italy<sup>13</sup>.

### Habitat and Ecology

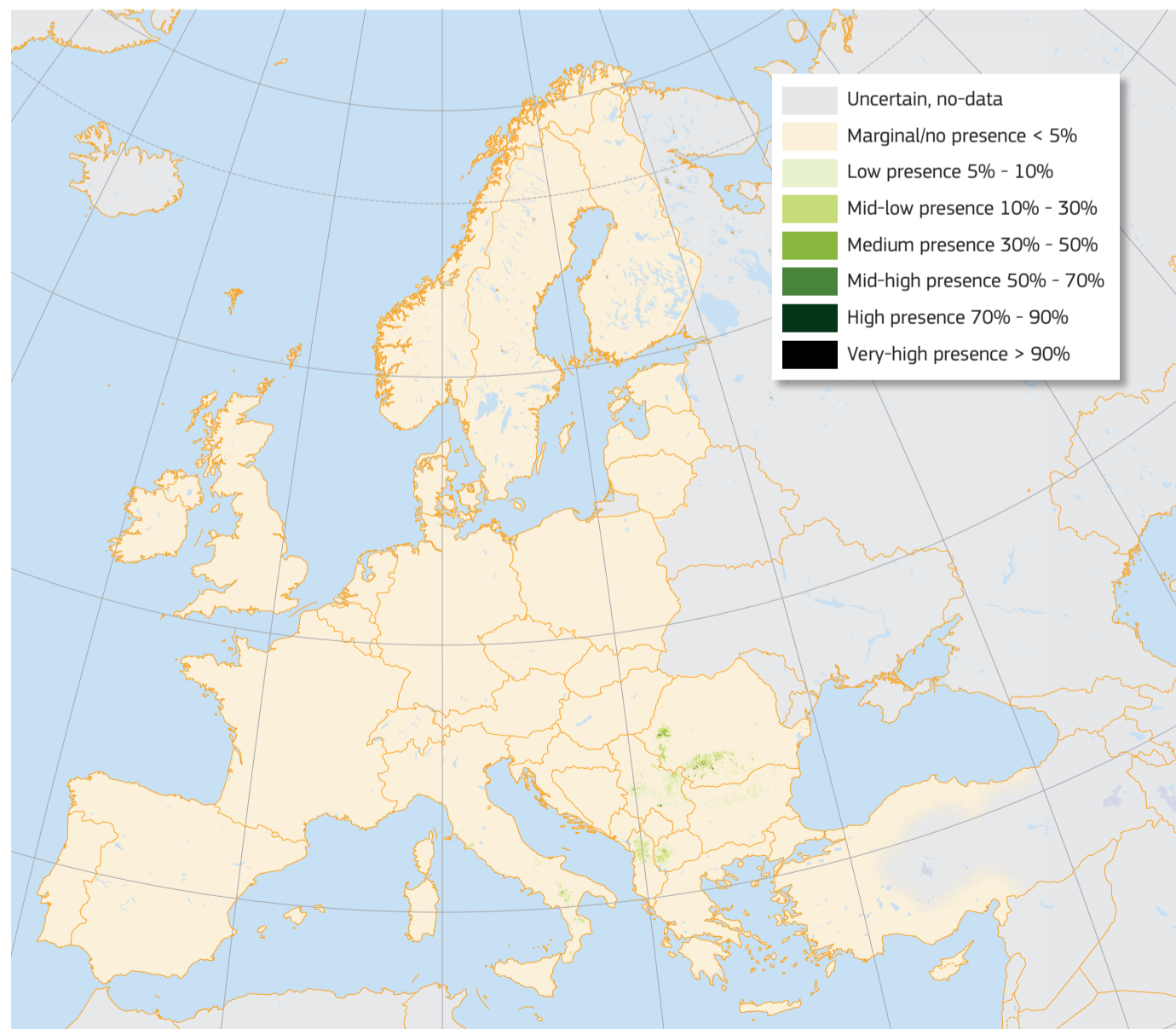
Hungarian oak is a **meso-xerophilous** species, meaning that it occupies a climate that is a transition between the typical Mediterranean climate and a continental climate with hot summers and harsh winters<sup>14</sup>. It is light demanding and cannot tolerate shading<sup>14</sup>. It can grow in heavy acidic soils and tolerates some water-logging<sup>15</sup>. This species can form pure stands or more frequently it occurs mixed with hop hornbeam (*Ostrya carpinifolia*), oriental hornbeam (*Carpinus orientalis*), South European flowering ash (*Fraxinus ornus*) and Turkey oak (*Quercus cerris*)<sup>8</sup>. This tree has a narrower ecological amplitude than that of Turkey oak in most respects<sup>16</sup>. It is more drought-tolerant than the Turkey oak but less so than some other more Mediterranean oak species, such as holm oak (*Quercus ilex*)<sup>17</sup>.



Dark green leaves are shiny and smooth on upper side, while the lower one has dense hair.  
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### Importance and Usage

In Greece, it is an important timber tree and frequently managed as coppice forest for both firewood and timber in combination with grazing<sup>14, 18</sup>. In the other countries in which it grows, it is most often used for firewood, although the quality of the wood is similar to sessile oak (*Quercus petraea*)<sup>12</sup>. Because of the rather high durability of its wood, *Quercus frainetto* sometimes has been used as construction material in civil engineering and mining<sup>8</sup>. It was less suited for the manufacture of barrels and furniture<sup>8</sup>.



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



••• Mature acorn in scaled cup, which is hairy and sessile (stalkless) on twigs. (Copyright Franco Caldararo, www.actaplantarum.org; AP)



••• Trunk and crown near the top of the tree. (Copyright Somepics, commons.wikimedia.org; CC-BY)



••• Forest dominated by Hungarian oak in protected area forest near Foli in western Peloponnese peninsula (Elis, South Greece). (Copyright Huskarl, commons.wikimedia.org; PD)

## Threats and Diseases

In common with several other oak species across Europe, the Hungarian oak has suffered periods of decline, attributed to a variety of interacting biotic and abiotic causes<sup>19</sup>. It is vulnerable to *Lymantria dispar* and to root pathogens of the genus *Phytophthora* (*P. cinnamomi*, *P. ramorum*)<sup>20</sup>. In particular, *Phytophthora cinnamomi* is a significant factor in some areas<sup>21</sup>. Wood-boring beetles<sup>22</sup>, aphids (e.g. *Thelaxes suberi*)<sup>23</sup>, gall wasps and fungi (e.g. *Apiognomonina quercina*)<sup>24</sup> can all cause damage. Furthermore, the Hungarian oak is moderately susceptible to *Cryphonectria parasitica*<sup>20</sup>. Changes in rainfall distribution and incidence of stress-induced pathogens, such as *Hypoxylon mediterraneum*, are blamed for decline in old oak coppices in central and southern Italy<sup>19</sup>. In many parts of its natural range the presence of Hungarian oak has reduced as a result human pressure and the transformation of land (particularly the more fertile sites) into agricultural use<sup>12</sup>.



••• Polyphagous caterpillar of the gypsy moth (*Lymantria dispar*). (Copyright echoe69, www.flickr.com; CC-BY)



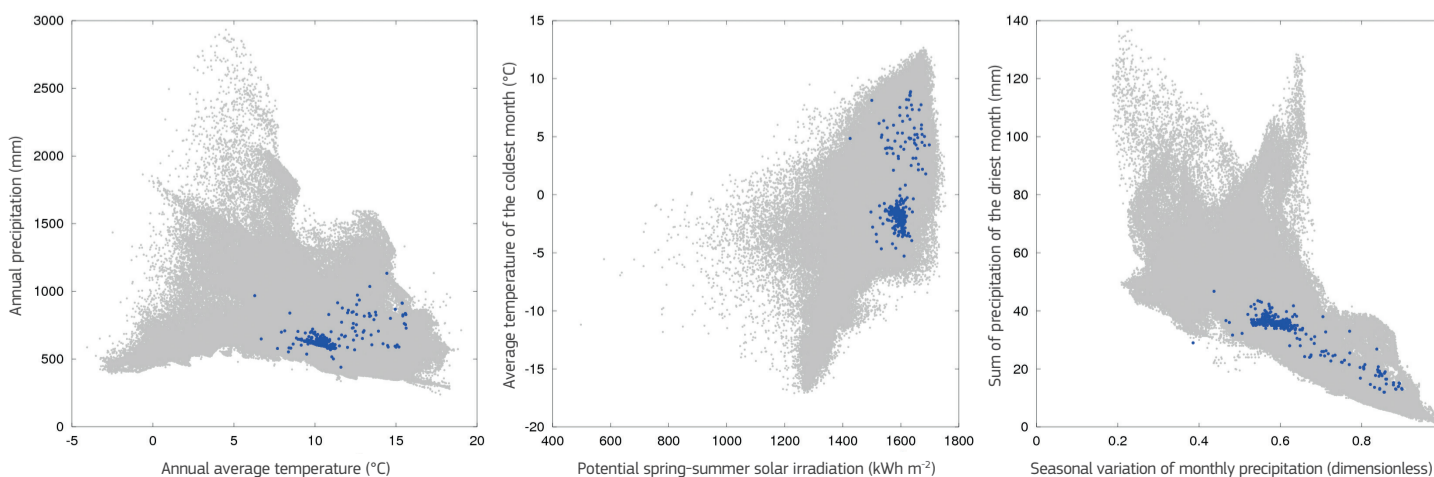
••• Barrels made from Hungarian oak wood for conserving and flavouring wine. (Copyright Elin, www.flickr.com; CC-BY)

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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/e01de78>. The purpose of this summary is to provide an accessible dissemination of the related main topics.

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