# *Carpinus orientalis* in Europe: distribution, habitat, usage and threats

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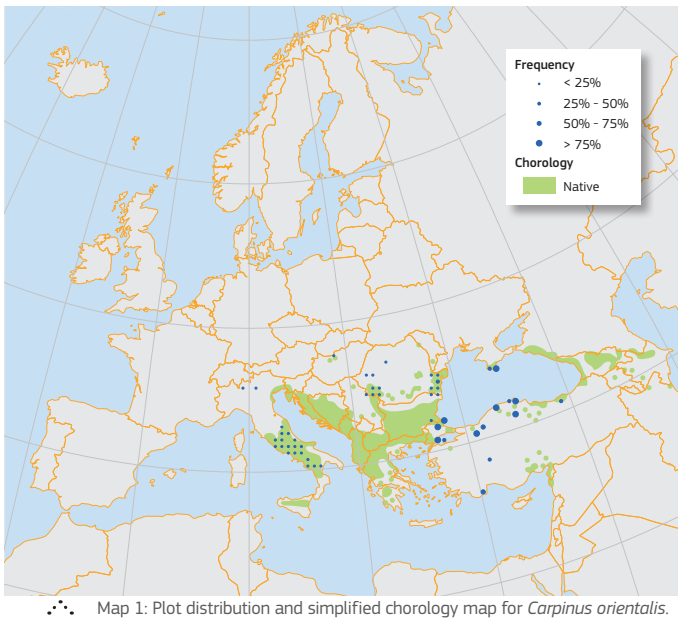
***Carpinus orientalis*** **Mill., commonly known as oriental hornbeam, is a small tree or shrub commonly found on dry and rocky slopes of low elevation mountains in South-East Europe. Its wide distribution range reaches through the Black Sea to the Caucasus region. It is a frugal and drought-resistant species, which prefers calcareous soils and is frequently found in disturbed sites. Thanks to its strong suckering capacity and hard wood, it is often managed in coppiced stands for the production of quality firewood and charcoal. No significant pests or diseases are recorded for this tree.**

The oriental hornbeam (*Carpinus orientalis* Mill.), is a large shrub or small tree, 1-5 metres tall, rarely up to 15 m, with a grey irregularly ribbed stem. The leaves are **ovate**-elliptic with evident veins, **tomentose**, with **serrate** margins and short **petioles** 5-8 mm long. This tree is **monoecious** with **unisexual** flowers blossoming in April. The male flowers are dense in short catkins 2-3 cm long, whereas the female catkins are 3-8 cm long with leaf-like un-lobed and coarsely toothed bracts that reach 12-18 mm size at maturity, and which cover the flowers and later the nuts[1-4].

## Distribution

The oriental hornbeam is a tree species native to south-east Europe, the **Pontic** region and western Asia. It is found in southern parts of Italy, Balkan Peninsula, Turkey, Syria, Caucasus and northern Iran, usually occurring at lower altitudes or on southern slopes up to 1 300 m in Europe, but growing at over 2 500 m in the Caucasus mountains[5-8].




Map 1: Plot distribution and simplified chorology map for *Carpinus orientalis*. Frequency of *Carpinus orientalis* occurrences within the field observations as reported by the National Forest Inventories. The chorology of the native spatial range for *C. orientalis* is derived after Meusel and Jäger[24].

The elliptical leaves have toothed margins and show evident veins.
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The oriental hornbeam is a shrub or small tree and rarely reaches 15 m.
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## Habitat and Ecology

This hornbeam is a **thermophilous** and **xerophilous** species, drought-resistant, thriving principally on slopes in shallow humus-poor or even rocky soils, and preferring calcareous substrates (**rendzina**)[9]. Over its wide distribution range, this species exhibits different ecological habits. In eastwards regions it occurs at higher elevations tolerating lower temperatures in more temperate climates[10]. In south-east Europe it is a typical element of the sub-Mediterranean vegetation, and it can also be found in the inner regions with some continental influences (colder winters)[11-13]. It is very frugal, easily able to colonise open and degraded areas and to regenerate vigorously, promoting its presence in disturbed habitats, such as after the exploitation of primary oak forests[11, 14]. This species is found both as a dominating and secondary species in wood and shrub lands[11]. The principal tree communities in which it is found are the mixed deciduous forests with oaks, such as downy oak (*Quercus pubescens*), Turkey oak (*Quercus cerris*), Hungarian oak (*Quercus frainetto*), and with hop hornbeam (*Ostrya carpinifolia*) and South European ash (*Fraxinus ornus*)[11, 15, 16].

## Importance and Usage

Like other hornbeams (sometimes called ironwoods), the wood of the oriental hornbeam is very hard[17]. Because of its small size and bushy habit, this tree does not produce high value wood. It was used more in the past for making tool handles and other small household items[1, 17]. Thanks to its high aptitude for regeneration from root suckers, it can be managed in coppice stands for fuel production as firewood or charcoal[5, 17]. In southern regions coppiced stands are also used as a food resource for livestock in drought summers, when grasslands are completely dry[11, 18]. This frugal hornbeam is also suitable for the reforestation and restoration of degraded dry lands[5] and is highly resistant to wildfire[19]. It may be used as an ornamental plant, appreciated for its dense foliage and pollution resistance, and also as a hedge because of its re-sprouting capability[20].

The bark is smooth and grey.
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Fruits are small nuts covered by a leaf-like bract.
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Male catkins are 2-3 cm long.
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## Threats and Diseases

As other hornbeams, the oriental hornbeam may be attacked by the gypsy moth (*Lymantria dispar*)[21, 22]. It is also a susceptible host for the processionary moth (*Thaumetopoea processionea*)[21, 23].

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