

Acer campestre in Europe: distribution, habitat, usage and threats

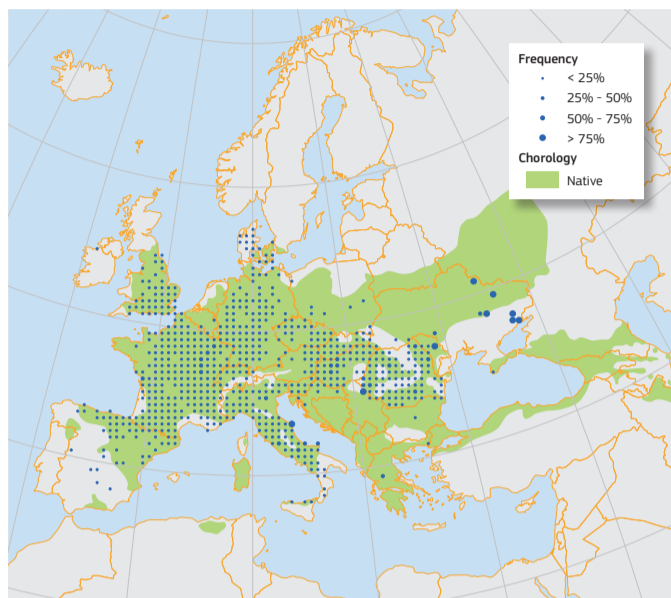
B. Zecchin, G. Caudullo, D. de Rigo

Field maple (*Acer campestre* L.) is a medium-size tree commonly growing in most of Europe and extending its range eastwards to the Caspian Sea. It is a mesophile species, forming part of temperate mixed deciduous forests as a subdominant tree. Together with elms, this maple has been planted traditionally in rural areas as living props for grapevines. It is also appreciated as an ornamental plant for its flowers and coloured foliage in autumn. Its wood is used mainly for fire and pulp, produced in coppiced mixed forests. There are few serious diseases affecting the field maple, principally causing damage on young seedling in nurseries.

Field maple is a medium-sized tree, typically reaching 15 m tall (exceptionally 25 m) and 60-70 cm in trunk diameter. It can be present as a tree, but also as a shrub in the understorey^{1, 2}. The bark is light grey, rather smooth and hard but with shallow fissures, exfoliating in small flakes when older². The crown is domed, usually low, with short side-shoots; bole is sinuous and the branch ends droop, then turn upwards³. Leaves are in opposite pairs, bright green when just unfolding, becoming darker. In autumn the foliage colour is rich gold over a long period, sometimes red. The leaf is simple, 5-16 cm long and 5-10 cm broad, with five blunt, rounded lobes with a smooth margin^{2, 3}. Flowers are small and yellow-green, about ten widely spaced in an erect head; flowering usually starts in late April, either simultaneously with, or several days before bud burst⁴. Field maple is a **monoecious** species, producing **hermaphrodite** flowers. Usually individuals show complex temporal patterns of sex expression during the flowering season. Pollination is typically **entomophilous**, but it is supposedly capable of dispersing some portion of its pollen by wind¹. The fruits are double **samaras**, crimson coloured with wings horizontally aligned at 180°, 2.5-3 cm long and grouped in 3-4 bunches. The samaras ripen in late September and are dispersed by the wind from mid October on. Seed dormancy lasts at least one year, natural germination usually takes 18 months; well-established 5 to 8 year-old seedlings begin rapid growth that lasts for about 25 years³⁻⁵.

Distribution

This species is adapted to areas that are in transition between Mediterranean and Euro-Siberian ecoregions. The natural distribution of field maple covers most of Europe: the latitudinal distribution ranges from 55° to 38°N, from central and southern England, southern Sweden and Denmark to the Pyrenees, Sicily, Greece and northern Turkey. Isolated occurrences can be found in Spain and North Africa. Field maple reaches its eastern limits in the Voronezh Region in Russia, in the Crimean Peninsula, in the



Map 1: Plot distribution and simplified chorology map for *Acer campestre*. Frequency of *Acer campestre* occurrences within the field observations as reported by the National Forest Inventories. The chorology of the native spatial range for *A. campestre* is derived after EUFORGEN¹⁵.

Caucasus and at the southern shores of the Caspian Sea^{4, 6-8}. This species has not been planted widely outside its natural range, except as an ornamental tree⁹.

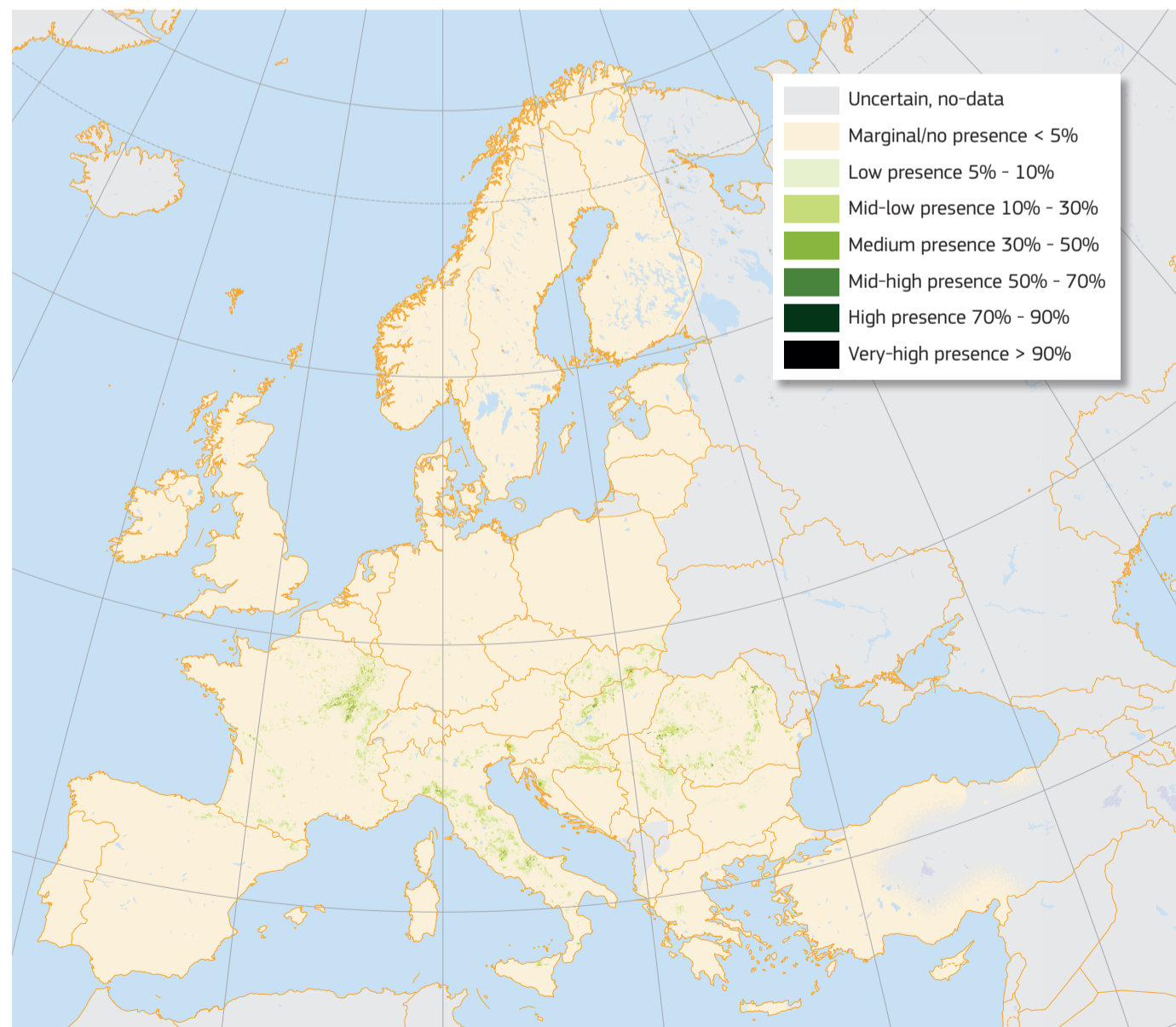
Habitat and Ecology

Field maple has a very wide ecological range, although it is more common in **mesophile** stands, especially deciduous oak forests, from sea level up to 1600 m in altitude^{4, 9}. It prefers warmer climates but it can also be winter hardy and tolerate the temperature extremes of continental sites, even if late frosts at the beginning of a vegetative season potentially have an impact on the distribution of the species^{1, 5}. Field maple has moderate

water needs and avoids waterlogging, favouring calcareous soils, but also grows well on heavy clay and is able to subsist on soils with pH lower than 6 or higher than 8. It is extremely shade-tolerant during the first decade, but light requirements are higher in seed-bearing years. It coppices very freely up to an age of 60-100 years and it is very tolerant of cutting and grazing of shoots; these factors make it well adapted for hedges^{2, 4}. Across its natural range, field maple does not form pure stands, but instead it is often a subdominant species in many plant communities. Given its low commercial importance, field maple is not normally silviculturally managed and often grows in spontaneously established and semi-natural populations¹. On the continent it can be characteristic of mixed broad-leaved woodland, especially with species of genera such as *Quercus*, *Tilia*, *Ulmus* and *Castanea*, and it is rare in coniferous forests^{2, 10}.



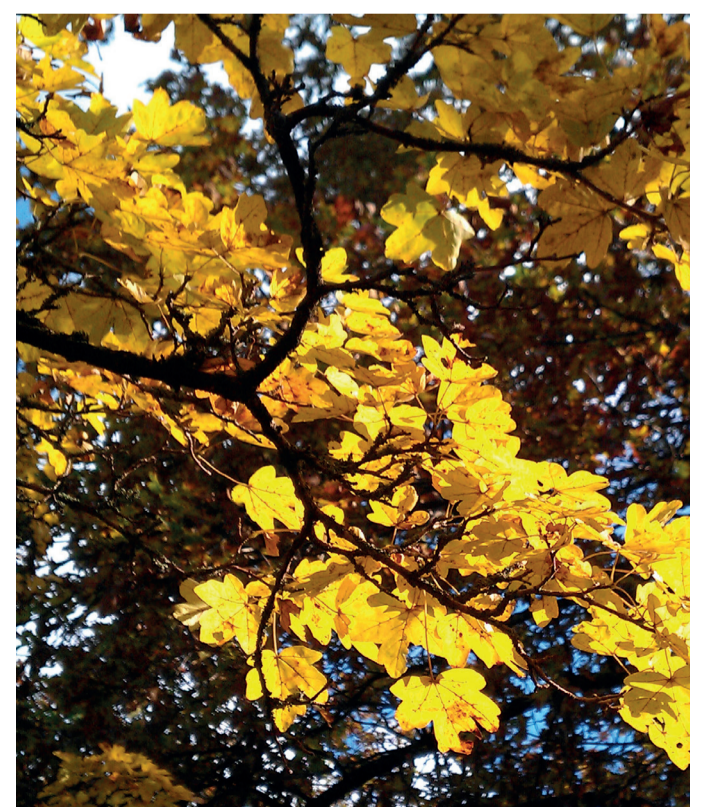
Corymb of hermaphrodite flowers with green-yellow stamens and sepals and no petals. (Copyright AnRo0002, commons.wikimedia.org, CC0)



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

Importance and Usage

The scientific name *Acer campestre*, which means properly field maple, probably originates from Italy, where this maple together with the elm (*Ulmus* spp.) were planted in fields and vineyards as living props for grapevines, and considered an important element of the landscape⁴. It is also commonly planted in gardens and parks and for street and roadside, as tree, scrub or in hedges, appreciated for its beautiful colours in autumn and for blossoms before leaves appear⁹. The wood is white, hard and strong and, when sizeable timber is available, it is used



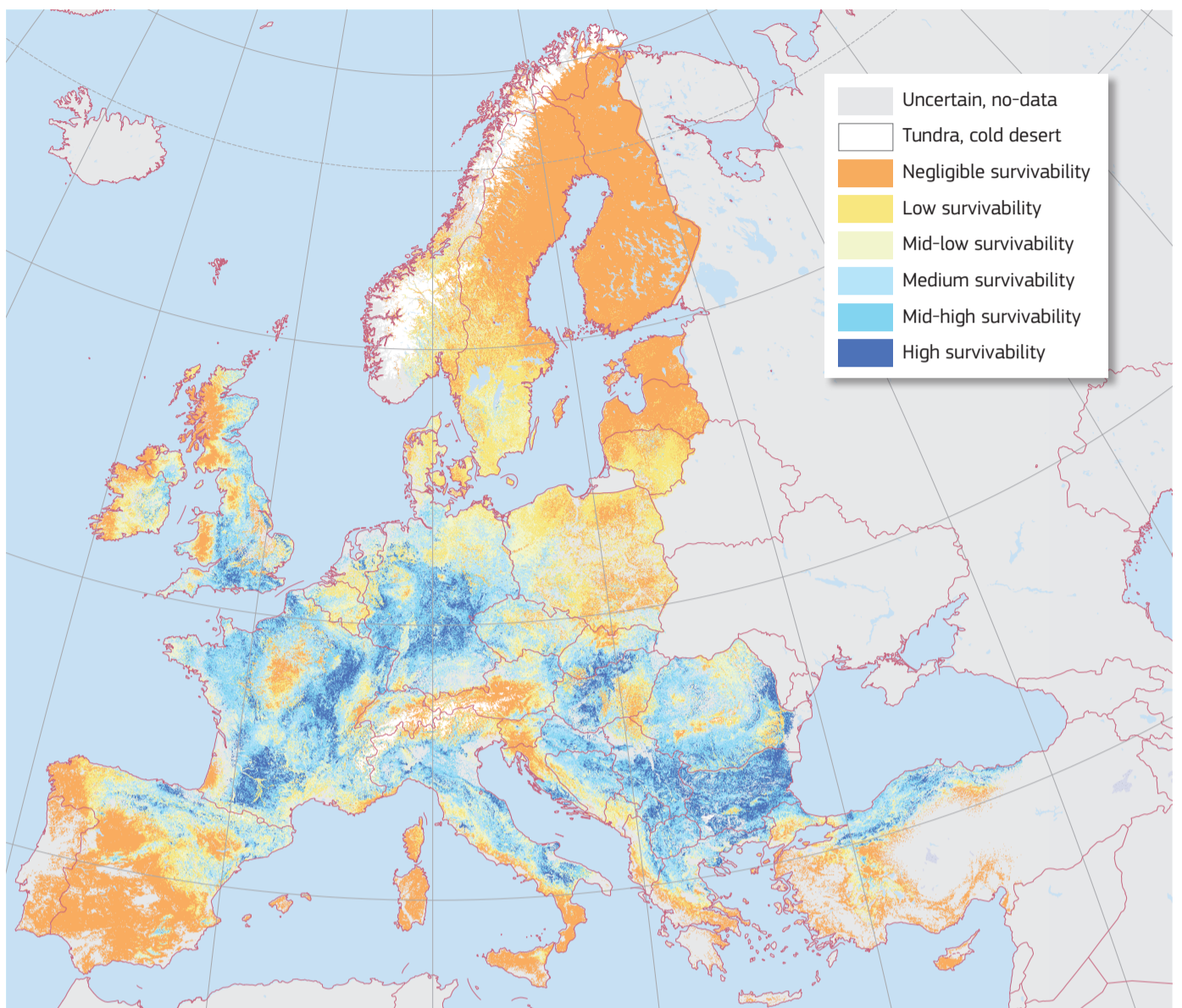
Five-lobed yellow leaves with smooth margins, displaying autumn colours. (Copyright Wendy Cutler, www.flickr.com: CC-BY)

for furniture, joinery and flooring. However, due to the small dimensions and low quantities produced, field maple wood is mostly used as firewood and pulpwood in coppiced mixed stands, in combination with other valuable broadleaved tree species. This species represents an interesting alternative to other maples for plantation in open areas with significant Mediterranean influence and sun-facing conditions, including protection forests on watershed slopes, as long as they are not too exposed. The bark is used in medicine as decoctions to treat sore eyes and as anti-cholesterol and astringent. Field maple flowers provide abundant pollen and its nectar used by bees resulting in good honey and honeydew yield^{4, 9}. The field maple distribution range overlaps with many areas in Europe with high erosion rates such as the European mountain systems¹¹. Its adventitious roots are suitable to be exploited for soil bioengineering to increase the stability of slopes and mitigate erosion¹².

Threats and Diseases

There are few serious health problems affecting the field maple, either in the field or in the nursery.

As other maples, this species can be a host for the fungus *Cryptostroma corticale*, which causes sooty bark disease, a pathogen common in northern America and now present Europe. It affects principally the sycamore maple (*Acer pseudoplatanus*), causing serious damage after hot and dry summers. A fungal pathogen of genus *Rhytisma* causes conspicuous dark round spots on leaves, affecting mainly sycamore maple, but with negligible impact on field maple growth¹³. In nurseries young maple seedlings can be damaged or killed by *Ceratocystis virescens* or infected by the powdery mildew caused by *Uniclinula bicornis*. The field maple and other species of genus *Acer* are highly vulnerable¹⁴ to the Asian longhorn beetle (*Anoplophora glabripennis*) which is a large wood-boring beetle native of Asian countries, such as Japan, Korea and China. Other negative agents affecting different maple trees include aphids as well as defoliating (*Lymantria*, *Operophtera*) and drilling (*Cossus*, *Xyleborus*) insects^{2, 6, 9}.



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



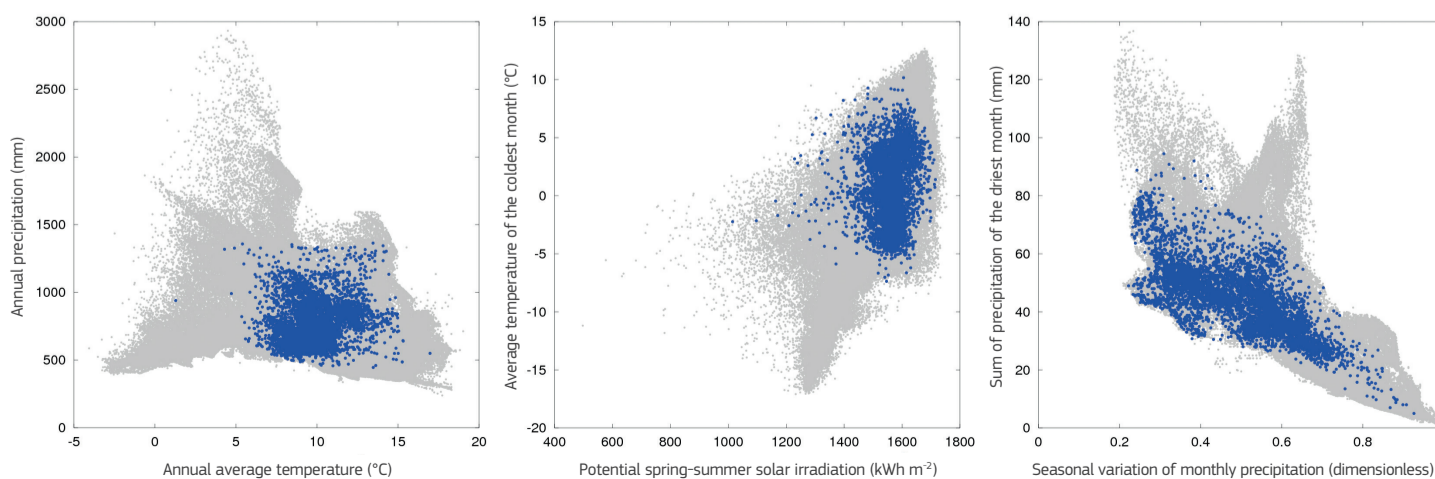
Large field maples with large domed crown in a garden park (Weinsberg, South Germany). (Copyright Rosenzweig, commons.wikimedia.org: CC-BY)



Seeds are green double samaras with horizontally aligned wings. (Copyright Pancrazio Campagna, www.actaplantarum.org: AP)

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

Autoecology diagrams based on harmonised field observations from forest plots.



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