EUFORGEN

Field maple

Acer campestre

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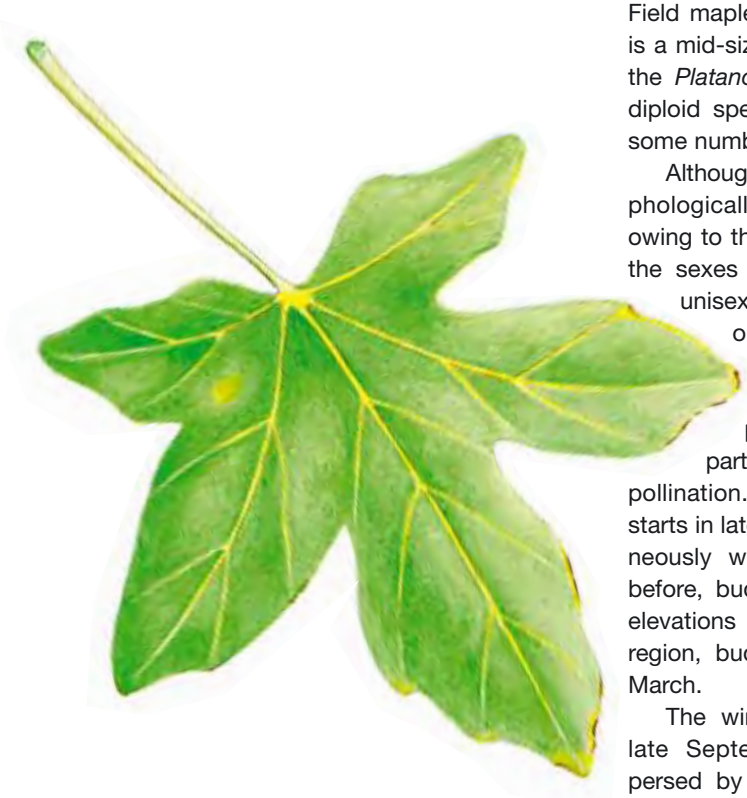
These Technical Guidelines are intended to assist those who cherish the valuable field maple genepool and its inheritance, through conserving valuable seed sources or use in practical forestry. The focus is on conserving the genetic diversity of the species at the European scale. The recommendations provided in this module should be regarded as a commonly agreed basis to be complemented and further developed in local, national or regional conditions. The Guidelines are based on the available knowledge of the species and on widely accepted methods for the conservation of forest genetic resources.



Biology and ecology

Field maple (*Acer campestre* L.) is a mid-sized deciduous tree of the *Platanoidea* section. It is a diploid species with a chromosome number of 2*n*=26.

Although the flowers are morphologically hermaphroditic, owing to the reduction of one of the sexes they are functionally unisexual. Dominantly male or female individuals are often observed. Field maple is insect pollinated and at least partially capable of self-pollination. Flowering usually starts in late April, either simultaneously with, or several days before, bud burst. In the lower elevations of the Mediterranean region, bud burst may start in March.

The winged seeds ripen in late September and are dispersed by the wind from mid-October on. As seed dormancy lasts at least one year, natural germination usually takes 18 months. During their early years,

seedlings tend to develop their root system and shoot elongation is limited. Well-established, 5- to 8-year-old seedlings begin rapid growth that lasts for about 25 years. The height of mature trees rarely exceeds 20 m, although exceptional specimens can reach almost 30 m in height and 90 cm in diameter, and live 250–350 years.

After reaching reproductive maturity at an approximate age of 20 years, this species is prolific and a regular seed disperser. As field maple has notable vegetative capabilities, it quickly recovers from stem injuries and branch system damage, and coppices vigorously.

The field maple has a very wide ecological range. The trees prefer warmer climates but are also winter hardy and tolerate temperature extremes of continental sites. Field maple has a moderate water need and avoids waterlogging, favours calcareous soils but also grows well on heavy clay and is able to subsist on soils with a pH lower than 6 or higher than 8. However, growth and lifespan are very limited under these conditions. It is extremely shade-tolerant during the first decade, but light requirements are higher in seed-bearing years.

Distribution

The natural distribution of field maple covers most of Europe. The latitudinal distribution ranges from 55°N 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 Caucasus and at the southern shores of the Caspian Sea.

Field maple usually grows at lower elevations, extending up to 800 m a.s.l. in Bavaria, 1400 m in Switzerland and 1800 m in the Caucasus.

Its excellent social capabilities make field maple one of the most characteristic mixed species of the Central and East European broad-leaved forests. Usually found in the lower canopy, it has an important role in formation of the vertical structure of xerothermic oak forests, gallery forests and Mediterranean shrub vegetation. In the arid lowlands, field maple is often found in codominant position with oaks, while in humid areas or higher elevations it has only a limited competitiveness and is nearly overcome in beech and hornbeam mixed forests.

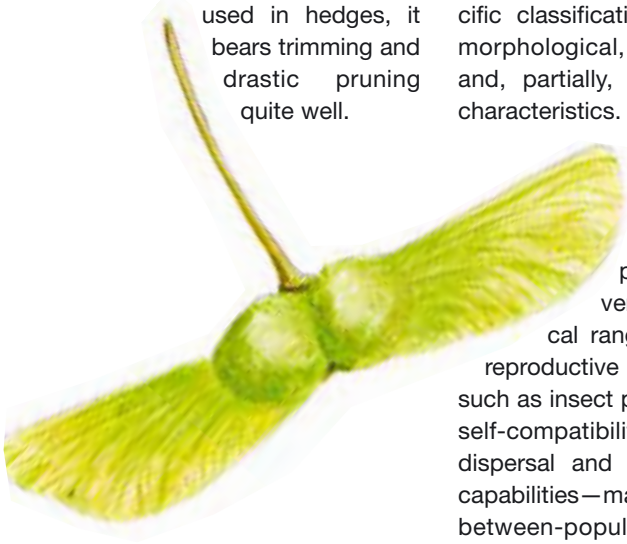
Importance and use

The scientific name *Acer campestre* presumably originates from Italy, where, especially in Tuscany, field maples together with elms were planted in the fields and vineyards as living props for grapevines, and considered an important element of the landscape.

Field maple rarely produces timber-sized trees. When sizeable timber is available, it is used for cabinetry, turnery and carving. Regrettably, it is mostly used as firewood and pulpwood due to the small dimensions and low quantities produced, although its valuable wood deserves more attention. Its timber is the hardest and has the highest density among the European maples, being fine-grained, tough, elastic and hard to split, with a pale reddish or brownish tint and a silky shine. Pith flecks are frequent. The timber of the roots is often bunched and is valued for small objects of fine craftwork.

The bark is slightly anticholesterolemic and astringent; a bark decoction has been used to bathe sore eyes. The

sap contains some sugar and can be drunk or boiled into syrup. The sugar content is considerably lower than in sugar maple (*Acer saccharum*) sap. Field maple is a melliferous plant with good honey and honeydew yield. It has limited ornamental importance, but when used in hedges, it bears trimming and drastic pruning quite well.



Genetic knowledge

Information on the species' genetic resources is very scarce due to a lack of extensive genetic studies.

Field maple is a taxonomically divided species. Its intraspecific classification is based on morphological, phenological and, partially, ecogeographical characteristics. Genetic differentiation is presumed from the high morphological polymorphism and its very wide ecological range. The species' reproductive characteristics—such as insect pollination, partial self-compatibility, limited seed dispersal and good vegetative capabilities—may lead to higher between-population variation compared with other widely distributed species. In addition, the observed separation of functionally unisexual flowers (even specimens) and their segregation to more or less distinct flowering phases, substantially limits the possibility of random mating.

Owing to the low economic importance of field maple, human impact on its genepool is fairly low. The genetic structure of the populations, the range, distribution and ecogeographical pattern of the genetic variation is presumably close to the natural state. Long-distance transfer of reproductive material, aggressive management techniques and habitat destruction do not affect the genetic constitution of field maple in most of its distribution area.

Threats to genetic diversity

On a pan-European scale, field maple is not endangered at species level. This species seems to maintain persistently almost the same distribution area. Stress caused by human influence, biotic and climatic factors, including sudden changes in site conditions, is considered fairly low. Hybridization pressure is negligible, with a slight possibility of crossing with ornamental varieties near populated areas.

However, this species might be endangered at the population level. In spite of the existence of long-range pollen transfer mechanisms, the effective size of marginalized populations might be too small to maintain sufficient genetic diversity. In certain cases, field maple has suffered from competition in gallery forests with invasive species like *Acer negundo* or *Fraxinus pennsylvanica*. It also has suffered from habitat destruction and changes in land use, especially in the lower forest zone.

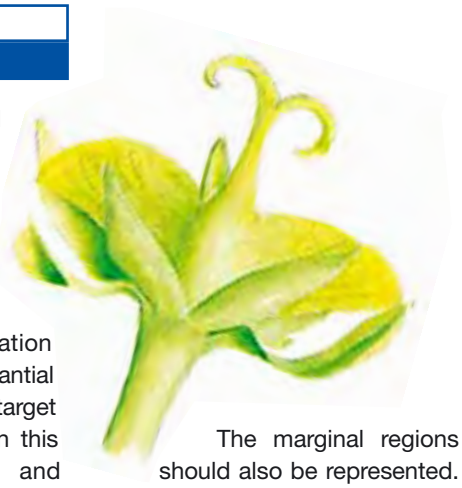
Guidelines for genetic conservation and use

Given the presumed good overall status of the genetic resources and the limited value of field maple, a low-intensity *in situ* conservation approach is advised.

An efficient conservation programme requires substantial genetic knowledge of the target species. In order to obtain this knowledge, inventories and genetic studies are needed to assess the existing genetic diversity and its distribution. As this information is lacking, several general measures are described below.

With regard to the different ecological conditions within the natural distribution, a network of at least 30 *in situ* conservation units, each with more than 50 unrelated, flowering and seed-dispersing specimens, is needed to capture the existing adaptability. This network should evenly cover the whole distribution area, as well as the ecological variation of the occurrences.

In order to enhance efficiency, the network might include existing conservation areas, seed stands, breeding collections and conservation units of other species (e.g. oak, beech, other noble hardwoods), as long as the management practices and measures do not hinder the conservation of field maple genetic resources.



The marginal regions should also be represented. In the case of endangered, fragmented or small populations, and stands growing under special conditions or carrying unique features, *ex situ* collections should supplement the network of conservation units. These collections should be established from propagation material obtained within the same ecological region, should be designed to avoid inbreeding and be preferred for use as seed sources.

Maintaining the landscape function of field maple in vineyards could be an efficient approach for on-farm conservation in agricultural areas.

Acer campestre

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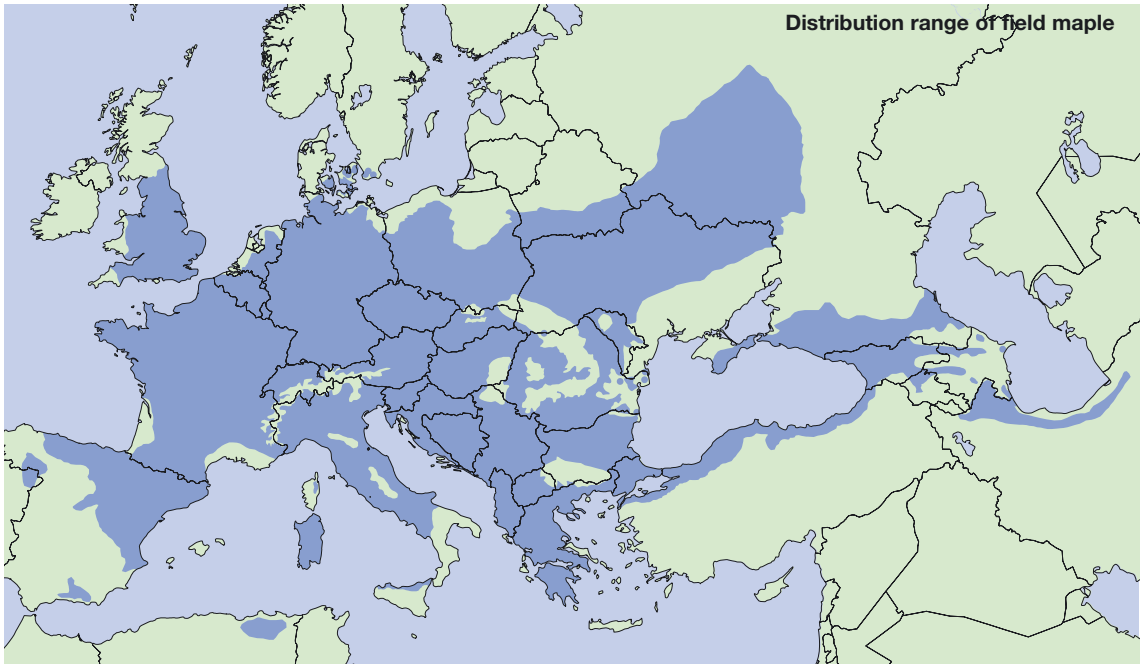

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These Technical Guidelines were produced by members of the EUFORGEN Noble Hardwoods Network. The objective of the Network is to identify minimum genetic conservation requirements in the long term in Europe, in order to reduce the overall conservation cost and to improve the quality of standards in each country.

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