

**Sycamore** (*Acer pseudoplatanus*),  
**Norway maple** (*A. platanoides*)  
**and Field maple** (*A. campestre*)  
**for high quality timber**

# 4 The genus *Acer*

The species from genus *Acer* with highest productive potential in Europe are Sycamore (*Acer pseudoplatanus*), Norway maple (*Acer platanoides*) and, to a lesser extent, Field maple (*Acer campestre*).

Sycamore and Norway maple occur in a similar distribution area, mainly in Central Europe and, less frequently, Southern Europe.

Both species appear scattered in broadleaved forests, preferably in fresh, humid and nutrient rich sites, including riparian areas.

In this document both species will be considered together, as the main difference between them is a slightly higher tolerance to drought and lower growth rate in the case of Norway Maple.



Distribution of sycamore (*Acer pseudoplatanus*).  
Source: EUFORGEN 2009.

## Why planting maples to produce timber ?

Maple timber is quite valuable, reaching exceptional prices when fibres show a wavy aspect. Additional to its excellent aesthetic properties, this timber is easily worked. The most common industries for this timber are sawnwood and, for the best logs, veneer, when they reach highest price. This species is very appreciated for cabinetmaking, woodturning and furniture making.

Sycamore is among the valuable broadleaved species with highest growth rate under adequate conditions. In a high quality site it is possible to achieve rotations of about 40 years, with a target diameter of 50 cm.



*Sycamore (A. pseudoplatanus).*  
Photo: Philippe Van Lerberghe. IDF




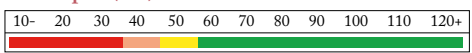
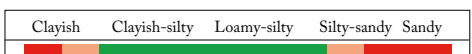
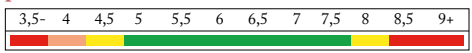
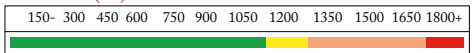
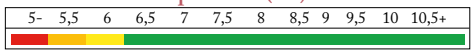
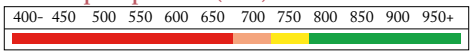
*Norway maple (A. platanoides).*  
Photography: Pierre Gonin. IDF.



Photography: Philipp Zinger.

## What are the main requirements of maple ?

Sycamore and Norway maple have rather similar requirements with regard to climate and soil features. They occur preferably on deep fresh soils, well drained and without stagnation. Young seedlings are favoured by shading, but from years 4-7 onwards they grow optimally when exposed to direct light. The following figure summarizes the main ecological features required by maples for optimal growth and valuable timber production.

	Comments
<p><b>Soil depth (cm)</b></p> 	Maples require deep and fresh soils, preferably thicker than 70-80 cm.
<p><b>Texture</b></p> 	Optimal texture is loamy - silty, always that there are no stagnation problems. Soils with deficient drainage, as well as those with low water and nutrient retention capacity, are to be avoided.
<p><b>pH</b></p> 	Maples are favoured by neutral pH, despite tolerating active limestone and gypsum. They are also demanding species regarding nutrient richness. These species tolerate moderate salinity levels.
<p><b>Altitude (m)</b></p> 	These species lie in altitudes ranging between 600 and 1000 m, although they can reach 1800 m altitude in areas with Mediterranean influence. Maples are not affected by severely low temperatures or late Spring frosts, thank to their late flushing. However, early Autumn frosts and extreme summer heat can affect them negatively.
<p><b>Mean annual temperature (°C)</b></p> 	
<p><b>Annual precipitation (mm)</b></p> 	Optimal annual precipitation is over 800 mm, although it can tolerate summer droughts of around 2 months, always that they are compensated by high air humidity.

Water need	Sensitivity to temporary stagnation	Need for Ca, Mg and K	N and P need	Active limestone sensitivity	Wind sensitivity	Drought sensitivity	Sensitivity to competition for light
High	High	Medium	Medium	Low	low	Medium - high	Low (young) - high (adult)

Under adequate conditions, especially regarding sufficient nutrient and water availability and without stagnation problems, maples show a fast growth rate. These species are especially interesting for areas with high air humidity, as well as in areas protected by prevailing winds and evaporative stresses. In open areas maples tend to lose or fork the terminal shoot, which needs to be corrected by formative pruning.



Sycamore (*Acer pseudoplatanus*).  
Photography: Jean-Pierre Ortisset.  
CRPF.



Norway maple (*Acer platanoides*).  
Photography: Jean-Pierre Ortisset.  
CRPF.



Sycamore.  
Photography: Philippe  
Van Lerberghe. IDF.



Norway maple.  
Photography: Pierre Gonin.  
IDF.

## Pests and diseases of maples

There are few severe health problems affecting maples that represent a significant restriction to their commercial use. It is very common to observe attacks from fungus *Rhytisma acerinum* (1), with conspicuous dark round spots but with negligible impact on tree growth. Other negative agents affecting maples include aphids as well as defoliating (*Lymantria*, *Operophtera* (2)) and drilling (*Cossus*, *Xyleborus*) insects. A fungus deserving attention is *Cryptostroma corticale*, which attacks especially after periods with high temperatures drying the bark and potentially resulting in the death of the tree. Moreover, the spores of this fungus can cause severe allergies to human beings.



## First steps of plantation

The first steps of a maple plantation are similar to those of other valuable broadleaved species.

### *Choosing the plant*

It is recommendable to utilize vegetative material from provenances with features similar to those in the plantation area, especially with regard to soil characteristics and severity of summer drought. The plant must show a healthy terminal bud and a unique, robust, branchless stem. The root system must be well developed, with abundant secondary roots. It is recommended to utilize 1 year old plants (1+0), 40-50 cm high.

### *Soil preparation*

After clearing the pre-existent vegetation that could interfere with the execution of plantation works, it is recommendable to perform a sub-soiling, preferably crossed (in 2 perpendicular directions), to the maximum depth possible, in order to promote soil water retention. The opening of plantation pits can be done by either backhoe excavator or manually. In any case, pits size should be defined according to plant dimensions.

### *Planting*

Plantation is executed during dormancy period, normally between November and March, avoiding days with risk with frosts, precipitation or strong winds. When planting, the root system must be well stretched, with the stem base over ground level. It is recommendable to apply an initial watering of 30-40 l/tree, if no precipitation is foreseen during the first weeks after planting.

### *Protecting*

During first years it is recommendable to utilize a ground cover (mulch) in order to avoid negative weed effects. This technique prevents light from reaching the soil, thus keeping the soil over the root system free of vegetation that could compete for water and nutrients. Browsing damage must be avoided with the use of tree shelters, preferably with mesh wall, that can be complemented by electric fencing in the perimeter of the plantation.

Damage caused by severe drought could be prevented by emergency watering. When existent, it is possible to plant 50 cm away from brushes, which can be respected in order to reduce weed competence and browsing damage. These brushes, with an accompanying auxiliary function, must be controlled if shading the upper part of the tree.



Photography:  
Philippe Van Lerberghe. IDF.

## Plantation management

Because of their vigorous and fast growth maples require an active and dynamic silviculture (pruning and thinning). Thinnings are applied for favouring the best trees: those showing the best morphology and growth rate. These trees will reach the final cutting to be utilized in the highest quality industrial destinations.

### Pruning

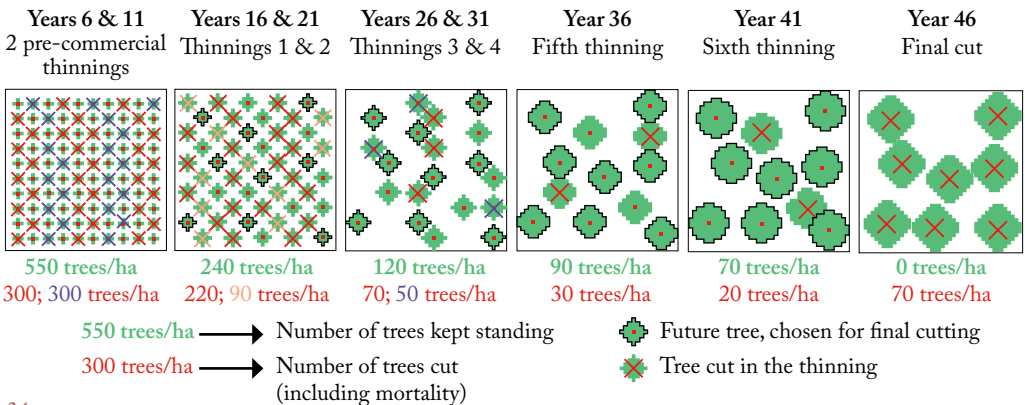
Maple often form forks in the terminal shoot, as well as sprouts at the stem base. These situations must be solved promptly. During **formative pruning** the branches that appear in the upper part of the crown that could compete with the main shoot are cut or blunted, as well as the forks. During **quality pruning** the branches thicker than 3 cm at their base are cut, to prevent the existence of big knots. The aim of pruning is to form a clean bole without branches 3 - 6 m long in 100-120 trees/ha, by eliminating progressively the crown base, and always respecting, at least, the upper half of the tree with branches. With this balanced and progressive intervention the stress caused to the tree is mitigated and the risk of emergence of epicormic shoots is reduced. Optimal pruning period ranges from mid June to early August.



Pruning of a young maple.

### Thinnings

Thinnings consist on eliminating those trees with least commercial potential, when they can compete with the best ones for light and nutrients. With this intervention, the growth rate of the best trees remains high, as growing without competence. Despite tolerating shading during early years, maple reaches its highest growth rate when exposed to direct light. On the other hand, a moderate, lateral shading, can be beneficial for maple, as maintaining a “forest climate” conditions with mitigated evaporation and wind effect. First thinning is applied generally when trees reach 10 – 12 m height, with further thinnings every 5 – 10 years. Despite it is possible to keep higher densities than in other valuable broadleaved species, it is recommended to apply frequent and moderate thinnings in order to avoid a sudden exposition to sunlight. Example of thinning plan on a pure sycamore plantation: 3x3 m - 1.150 trees/ha).



## Other silvicultural schemes with maples

Besides the example of thinning plan analyzed (1,150 maples/ha), there are many alternative schemes for the utilization of maple for valuable timber production in our conditions, as shown below.

### *Mixed plantation*

Maples can be combined with one or more valuable broadleaved species. Because of the fast growth rate of maple, an interesting combination could include species with longer rotation, such as *Sorbus* or walnut. Because of the high demand of air humidity and its need for partial shading, it would also be interesting to combine maple with alternative productions that provide a lateral shading during first years: in this sense, a mixed plantation with poplar (for either biomass or veneer production) would be a wise choice, as poplar would provide micro-climate conditions optimal for maple development during the first years, and would lead to a short-term (12-14 years) income, that would allow covering plantation costs



*Mixed plantation with maple.*  
Photography: Grégory Sajdak. IDF.

### *Plantation for forest diversification*

This productive scheme consists on performing small-sized maple plantations, which can also include other valuable broadleaves, in forest spots with remarkably high site quality for these species: fresh areas such as valley bottoms, flat areas (abandoned terraces), etc. The management of these new stands would focus on promoting those planted trees with best shape and vigour, which will be pruned during the first years. In this scheme it is fundamental to apply measures for preventing potential negative impacts by weeds (e.g. by mulching), browsing damages (shelters) and by excessive shading by surrounding trees (selective thinnings). With such a minimal intensity management, focused only on small areas, it is possible to increase considerably the economic value of the forest, produce interesting revenue and promote its environmental and landscape values, especially if these plantations are implemented within pure stands dominated by conifers.



*Plantation for forest diversification.*

### *Silvo-pastoral systems*

Maple is an interesting species for its use in silvo-pastoral systems, where timber production and grazing are combined at the same space. These systems lead to revenue in the short term (grazing) and in the medium term (valuable timber), being especially interesting for low mountainous areas. The global productivity of these systems is superior to timber and grazing production separately, thank to the positive interaction between trees and animals: the trees benefit from the organic matter release (fertilization), while the animals find shelter (sun, wind, hail) under the tree crowns. These systems should be established in areas without risk of soil compaction, as the continuous presence of animals may lead to root suffocation. It is also compulsory to protect trees with shelters adapted to the animals utilized.



*Maple in silvo-pastoral system with cows.*

## Field maple (*Acer campestre*)



Distribution of field maple (*Acer campestre*).  
Source: EUFORGEN 2009.

Field maple (*Acer campestre*) occurs in a large proportion of European forests located on neutral or basic soils, from lowlands to middle mountain conditions. Despite it frequently appears as a small tree, it can reach 20 m height under adequate site conditions.

This species is especially adapted to areas that are transition between Mediterranean and Euro-Siberian. As field maple can tolerate both conditions, it occurs in very diverse forests. Field maple tolerates poor soils and especially drought much better than sycamore and Norway maple. Early growth rate is similar to other maple species, but it slows down afterwards. It grows optimally with full sun,

although it can also tolerate moderate shadowing and competence.

This species represent an interesting alternative to other maples for plantation in open areas with significant Mediterranean influence and sun-facing conditions. Despite its higher tolerance to drought, annual precipitation should be at least 600 mm to allow a growth rate justifying the choice of this species. As it has difficulties reaching large dimensions, it is recommended to use it in combination with other valuable broadleaved species with higher potential for premium timber production.

Alike other maples, it is necessary to apply formative pruning for promoting a unique straight stem and a vertical growth of the tree, that must be free of forks. This pruning should be applied every 2-3 years. Quality pruning is applied until reaching a branchless clean bole at least 3 m long.

With regard to pests and diseases, this species is affected by the same agents as other maples.



Photography: Frank Vincentz.



Photography: Óscar Cisneros.



Photography: Mireille Mouas. IDF.





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