How to read the Atlas

General information

This section provides a brief overview on how to understand the information provided in the species chapters present in this Atlas. In each chapter there is an extended summary of the current state of knowledge about that species, which is aimed to be written in an easily accessible style but at the same time scientifically grounded. Therefore, each chapter has been through a revision by scientific experts and includes a comprehensive list of scientific references. Although the chapters have been written by a number of different authors, they have been harmonized to obtain species information that is as homogeneous as possible throughout the Atlas. The full version of each chapter (expanded and fully peer-reviewed) will be published in the online version of the Atlas at http://w3id.org/mtv/FISE-Comm/v01.

Each chapter starts with a summary and description of the species to continue with paragraphs concerning the species distribution, habitat and ecology, importance and usage and finally threats and diseases. Most chapters deal with a single species, although in a few cases the information is presented at taxon level (e.g. circumboreal Mediterranean firs).

A key contribution of this Atlas is the inclusion of innovative maps and diagrams concerning: 1) Frequency and chorology; 2) Modelled Distribution; 3) Maximum Habitat Suitability; 4) Autoecology, for all those species for which sufficient data exist. High quality images are also included relative to forest habitat, individual trees or more detailed images concerning the bark, leaves, fruits and flowers.

Frequency and Chorology

This map summarises two basic pieces of information concerning the species:

1. The species frequency over a 50km square grid (blue dots) shows the percentage of plots inside the grid that contain the species of interest. The sampling points are derived from the same datasets used to model the species distribution (Map 2) and the maximum habitat suitability (Map 3).

2. The species chorology: this is the broad range and its optimal growth is in humid soils situated on calcareous areas sensitive to drought and moisture availability are limiting factors for the distribution of Fagus sylvatica. The optimal climate for beech is characterised by high growing season of at least 140 days, and for this reason cannot normally present at altitudes of more than 1 000 m, and can even be sensitive to higher temperatures because of its range into Scandinavia and the Baltic States. Fagus sylvatica is one of the most diversely used tree species in Europe. Its wide range overlaps with that of other tree species. It is not particularly salt-tolerant and grows in a wide variety of soils with a pH range from 3.5 to 8.3, although it cannot tolerate the most acidic conditions. Beech shows a moderate avoidance of urbanisation; it prefers moderate fertility found in lightly-wooded and slightly acid soils and is more tolerant of urbanisation than other tree species. The beech has a high level of tolerance to pollution and can be coppiced for fire wood and charcoal production. It is also used in the wood industry and can be used in other sectors like the furniture industry, as well as for pulp and paper. Beech is a large deciduous tree that can maintain its high growth rate until late maturity. Its natural range extends from southern Scandinavia to Sicily, from Spain in the west to northeastern Turkey in the east. Though not demanding of site type, beech can grow well in a range of different soil types and tolerates rigorous winters well, but is sensitive to spring frost. Dueing the capacity of its root system for assimilating the resources of air throughout the soil, and the amount of photosynthesis in its leaves, Beech trees conserve the productive capacity of the soil better than many other species. It is wind and fires well making it ideal for a wide range of uses, from furniture to musical instruments, as well as for pulp and fuelwood.

Fagus sylvatica

**Fagus sylvatica**

(Family Fagaceae)

**Common names**

European Beech, Stag’s Horn 

**Description**

A large deciduous tree

**Habitat and Ecology**

This map summarises two basic pieces of information concerning the species frequency over a 50km square grid (blue dots) shows the percentage of plots inside the grid that contain the species of interest. The sampling points are derived from the same datasets used to model the species distribution (Map 2) and the maximum habitat suitability (Map 3). The species chorology: this is the broad range and optimal growth is in humid soils situated on calcareous areas sensitive to drought and moisture availability are limiting factors for the distribution of Fagus sylvatica. The optimal climate for beech is characterised by high growing season of at least 140 days, and for this reason cannot normally present at altitudes of more than 1 000 m, and can even be sensitive to higher temperatures because of its range into Scandinavia and the Baltic States. Fagus sylvatica is one of the most diversely used tree species in Europe. Its wide range overlaps with that of other tree species. It is not particularly salt-tolerant and grows in a wide variety of soils with a pH range from 3.5 to 8.3, although it cannot tolerate the most acidic conditions. Beech shows a moderate avoidance of urbanisation; it prefers moderate fertility found in lightly-wooded and slightly acid soils and is more tolerant of urbanisation than other tree species. The beech has a high level of tolerance to pollution and can be coppiced for fire wood and charcoal production. It is also used in the wood industry and can be used in other sectors like the furniture industry, as well as for pulp and paper. Beech is a large deciduous tree that can maintain its high growth rate until late maturity. Its natural range extends from southern Scandinavia to Sicily, from Spain in the west to northeastern Turkey in the east. Though not demanding of site type, beech can grow well in a range of different soil types and tolerates rigorous winters well, but is sensitive to spring frost. Dueing the capacity of its root system for assimilating the resources of air throughout the soil, and the amount of photosynthesis in its leaves, Beech trees conserve the productive capacity of the soil better than many other species. It is wind and fires well making it ideal for a wide range of uses, from furniture to musical instruments, as well as for pulp and fuelwood.

**Distribution**

Beech is the most widespread forest tree species in Europe. It is a large deciduous tree that can maintain its high growth rate until late maturity. Its natural range extends from southern Scandinavia to Sicily, from Spain in the west to northeastern Turkey in the east. Though not demanding of site type, beech can grow well in a range of different soil types and tolerates rigorous winters well, but is sensitive to spring frost. Dueing the capacity of its root system for assimilating the resources of air throughout the soil, and the amount of photosynthesis in its leaves, Beech trees conserve the productive capacity of the soil better than many other species. It is wind and fires well making it ideal for a wide range of uses, from furniture to musical instruments, as well as for pulp and fuelwood.

**Function**

Beech is one of the most important and widespread broadleaved trees in Europe. It is a large deciduous tree that can maintain its high growth rate until late maturity. Its natural range extends from southern Scandinavia to Sicily, from Spain in the west to northeastern Turkey in the east. Though not demanding of site type, beech can grow well in a range of different soil types and tolerates rigorous winters well, but is sensitive to spring frost. Dueing the capacity of its root system for assimilating the resources of air throughout the soil, and the amount of photosynthesis in its leaves, Beech trees conserve the productive capacity of the soil better than many other species. It is wind and fires well making it ideal for a wide range of uses, from furniture to musical instruments, as well as for pulp and fuelwood.

**Habitat and Ecology**

Beech is a broadleaved tree. It tolerates very poor soils and can grow on a wide variety of sites. Its optimal climate is characterised by high growing season of at least 140 days, and for this reason cannot normally present at altitudes of more than 1 000 m, and can even be sensitive to higher temperatures because of its range into Scandinavia and the Baltic States. Fagus sylvatica is one of the most diversely used tree species in Europe. Its wide range overlaps with that of other tree species. It is not particularly salt-tolerant and grows in a wide variety of soils with a pH range from 3.5 to 8.3, although it cannot tolerate the most acidic conditions. Beech shows a moderate avoidance of urbanisation; it prefers moderate fertility found in lightly-wooded and slightly acid soils and is more tolerant of urbanisation than other tree species. The beech has a high level of tolerance to pollution and can be coppiced for fire wood and charcoal production. It is also used in the wood industry and can be used in other sectors like the furniture industry, as well as for pulp and paper. Beech is a large deciduous tree that can maintain its high growth rate until late maturity. Its natural range extends from southern Scandinavia to Sicily, from Spain in the west to northeastern Turkey in the east. Though not demanding of site type, beech can grow well in a range of different soil types and tolerates rigorous winters well, but is sensitive to spring frost. Dueing the capacity of its root system for assimilating the resources of air throughout the soil, and the amount of photosynthesis in its leaves, Beech trees conserve the productive capacity of the soil better than many other species. It is wind and fires well making it ideal for a wide range of uses, from furniture to musical instruments, as well as for pulp and fuelwood.
the Cantabrian Mountains in the west to the Carpathians and Balkan Scandinavia to Sicily, from Spain in the west to northwest Turkey in the east. Though not demanding of soil type, large deciduous tree that can maintain its high growth rate until late maturity. Its natural range extends from southern Fagus sylvatica in Europe: distribution, habitat, usage and threats.

In practice, a given species may not be found in all the areas marked “high survivability” for other reasons (e.g. competition from or preferential planting of other species). However, in those areas marked “negligible survivability” the species is unlikely to grow, even if deliberately planted there.

The map is modelled with an innovative methodology taking into account the different spatial distributions of the underlying datasets as well as a number of bioclimatic and geographic factors. Detailed information on the data and techniques used can be found in the chapter “modelling, data and information on forest tree species” on page 40.

The overall climate space occupied by each of the field observations is derived after Meusel and Jäger, and EUFORGEN. At the southern part of its range (Spain, Sicily) it is only

Medium presence 30% - 50%

Low presence 5% - 10%

Uncertain, no-data

In some chapters, there is a supplementary box focusing on some particular aspects of the species or taxonomy considered (e.g. notes on the taxonomy of the species or information about a related species).

**Fagus orientalis**

Fagus orientalis is closely related to Fagus sylvatica (some authorities consider them to be subspecies, others consider them to be two separate species). In appearance they are generally very similar. The leaves are slightly longer, broader and not as glossy as Fagus orientalis, and tend to have more veins. It is also less common, being found in the Balkans, south-western France, northern Italy and China. It is said to be sensitive to drought and moisture availability are limiting factors for the F. sylvatica range for

Medium survivability

Low survivability

Uncertain, no-data

Field data in Europe (including absent areas)

**Autoecology Diagrams**

In most chapters, autoecology diagrams (also known as climate-space diagrams) have been derived for the described species, based on the datasets of field observations as harmonised within the Forest Information System for Europe (FISE). These observations are the same as those used to estimate the coarse-resolution forest plot distribution presented in Map 1. The local bioclimatic conditions where a given species is observed are obtained by means of a number of high-resolution bioclimatic and geographic variables. The number of possible combinations of variables is very large and for this Atlas we have focussed on three: 1. Annual average temperature vs Annual precipitation; 2. Potential spring-summer solar irradiation vs. Average temperature of the coldest month; 3. Seasonal variation of monthly precipitation vs. Sum of precipitation of the driest month. In the online version of the Atlas other combinations of variables may also be found.

The overall climate space occupied by each of the field observations on every species is represented by a grey spot (one for every plot), while those plots containing the species of interest are coloured blue, thus illustrating the specific climate niche of that species, and showing how a given species might be constrained by one or more climatic conditions. For more details on the data and modelling aspects, see the Atlas chapter “modelling, data and information on forest tree species” on page 40.

**Images**

Images have been carefully selected to help identification/understanding of species. Captions also identify the individuals who have provided the images and the relative copyrights. A complete list of contributors is at the beginning of the atlas.

**References**

Each chapter has been fully referenced with the most up-to-date scientific literature, which has been reviewed by three scientific experts. All the references are sequentially included through the text and listed at the end of the chapter. A revised and extended set of references will be available in the full online version of each chapter.