Pinus pinaster in Europe: distribution, habitat, usage and threats

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The maritime pine (Pinus pinaster Ait.) is a widespread medium-size tree native to the western Mediterranean basin. Its genetic variations, associated with a natural and artificial wide range of geographical locations, result in several subspecies that show a versatile adaptation to ecological factors. This pine dwells well in temperate–warm locations, from coasts to high mountains. It does not tolerate shade and shows preference for siliceous and sandy soils. Due to its underdemanding behaviour, salt spray tolerance and fast growth, it has been used for soils protection, reforestation of degraded areas and dunes stabilisation, as shelterbelts and also in intensive plantations. Its wood is appreciated for producing construction wood, poles and furniture. The maritime pine has been also traditionally utilized for the extraction of resin obtaining turpentine and resin. In the southern hemisphere, where maritime pine has been introduced for environmental and economical purposes, it has been considered as a highly invasive species.

The maritime pine (Pinus pinaster Ait.) is a medium-sized pine 20-30m tall, exceptionally reaching 40m. The bark is bright reddish-brown, thick, deeply fissured. The crown is regular, ovate or conic in young pines and irregular and open in adult pines, with branches densely clothed at the ends. Needles, occurring mostly in pairs but occasionally in groups of 3, are 10-25cm long, with shiny green and well-marked lines of stomata on both faces. They endure 2 to 3 years. Light brown cones, often collected as ornamentals, are persistent and grouped in clusters. They are slightly asymmetrical, with ovoid-conic shape and around 15 cm long (in a range of 8-22 cm). Their ripening occurs two years after pollination and they open the same summer or up to 10 years later. In these locations with high intensity and frequency of fires, usually serotinous cones are present. The scale presents broad ridge and up-curved prickle. Seeds are shiny black-brown above and matt grey below with a wing which is easily removed. Its root system consists in a deep taproot with well-developed secondary roots.

Distribution

Maritime pine is a thermophilous widespread conifer originally from the western Mediterranean Basin. It occurs in the Iberian Peninsula, South France, West Italy, western Mediterranean islands, North Morocco, Algeria and Tunisia. It has increased its presence, due to artificial plantations and its naturalisation, such as in the coast of southwestern France, Greece and Adriatic countries, but also in north Europe, such as United Kingdom and Belgium. As with other European pines, encroachment of former agricultural fields and plantation programmes, motivated by soil protection and reforestation of degraded areas, has resulted in its expansion during the 19th and 20th centuries. Moreover, intensive plantations were also established in the southern hemisphere with both economic and environmental objectives, in southwestern Australia, New Zealand, South America, United States and South Africa, where it has been considered an aggressive colonizer. Habitat and Ecology

Maritime pine is a light demanding and fast-growing species that occupies a broad range of elevations, climates and soils, presenting remarkable genetic variation as a result. There is debate about the number of subspecies, with some authors recognizing as many as five different subspecies corresponding to several geographical locations, while others consider up to 18 subspecies that could be grouped in 3 main groups: Atlantic, Circum-Mediterranean and Maghrebian. Maritime pine is ecologically versatile, showing a wide range of expressive traits regarding growth characteristics, frost resistance and adaptation to summer drought and limestone substrates. Naturally, it grows in warm temperate regions with an oceanic influence on climate, mainly in humid and sub-humid areas, where annual rainfall is greater than 600 mm. In spite of that, it is possible for trees to survive in areas with only 400 mm annual precipitation, providing there is sufficient atmospheric moisture. Maritime pine cannot tolerate shade and exhibits preference for siliceous soils with a coarse texture, especially sandy soils, dunes and other poor substrates. However, some subspecies can be found also inhabiting calcareous soils.

It inhabits from sea level in coastal lowlands to moderate elevations in the Iberian Peninsula (1600 m) and inland Corsica, up to around 2000 m in Morocco. Easily found establishing pure and open stands or mixed with other species, such as Aleppo pine (Pinus halepensis) and stone pine (Pinus pinea) on sandy coasts or sometimes in higher rocky hills. In Morocco it is a constituent of mixed coniferous forests with black pine (Pinus nigra), Moroccan fir (Abies pinsapo var. moroccana), Atlas cedar (Cedrus atlantica) and European yew (Taxus baccata).

Importance and Usage

The maritime pine has been widely used for dunes stabilisation, to enable the agricultural use of large areas along the western coast of the Iberian Peninsula, and as shelterbelts protecting agricultural crops against salt spray. In southwestern France it has also been used for sanitation plantations and economic development in the Landes, the largest continuous plantation forest in Europe where Maritime pine is the main species. Further, due to its fast growth characteristics and tolerance to poor soils, other uses include soil conservation, and protection of slopes against erosion, as well as shade tree in picnic areas, camp sites and recreational parks. The wood is the major product that is obtained from maritime pine, which has a broad range of final products such as construction wood,
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Field data in Europe (including absences)

- Annual average temperature (°C)
- Potential spring-summer solar radiation (kWh/m²)
- Seasonal variation of monthly precipitation (mm)

Autoecology diagrams based on harmonised field observations from forest plots.

References


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