

Quercus palustris in Europe: distribution, habitat, usage and threats

C. M. Enescu, T. Houston Durrant

Quercus palustris Muenchh. is commonly known as pin oak, Spanish oak or swamp oak. The epithet palustris means “swampy”, as pin oak is primarily found on wet sites. It is native to the eastern United States, but has also been introduced into Europe in the last centuries.

Pin oak is a fast-growing deciduous tree reaching 25(40) m tall, usually with a straight and undivided trunk^{1, 2}. Unlike many oaks, it develops a shallow, fibrous root system³. The bark is greyish-brown with fissures on surface higher up the trunk². The trunk usually has many small drooping branches that persist for a long time after dying and form small “pin” knots in the wood⁴. The twigs are reddish-brown and smooth¹ and the buds are small (3 mm), dull brown and almost hairless⁵. The leaves are alternate, ranging from 8 to 15 cm long, with five or seven lobes, and deep sinuses between the lobes. They are bright green above and shiny pale green below, with characteristic brown tufts of hair in the vein-axils². In the autumn they turn a rich scarlet-brown⁵ and often stay on the tree into the winter³. Flowering occurs in April or May. The dark-brown acorns are about 1 cm long with a very shallow cup on a short stalk^{2, 5}. It is not particularly long-lived and reaches physiological maturity at 80 to 100 years⁴.

Distribution

The natural distribution of pin oak is the north-central and eastern United States⁴. It was introduced in Europe at the end of the seventeenth century, primarily as an ornamental, but it has some potential as a forestry species⁶.

Habitat and Ecology

Pin oak occurs primarily along major rivers, in wet soils along swamps and streams⁴. It is tolerant of moist soil conditions and can grow on poorly drained and seasonally (winter) flooded sites⁶. It prefers moist, rich, acidic, well-drained soils⁷. It is intolerant of



Dark brown maturing acorn with shallow cup on short stalk. (Photographer Emily Mason; Copyright Bruce Kirchoff, www.flickr.com; CC-BY)

shade⁷ and it is unable to perform properly in soils with high pH, when it develops significant iron chlorosis problems^{4, 8}. It grows well in full sun³ but it prefers a humid climate⁴ and is sensitive to summer drought⁶.



Deep-lobed leaves turning to scarlet in autumn. (Copyright Tracy Houston Durrant; CC-BY)

Importance and Usage

The wood of pin oak has an inferior quality in comparison with other red oak species especially due to its many small knots⁴. Its wood is hard and heavy, and is generally used for fuel wood, wood pulp, and railway sleepers⁴. Thanks to its crown architecture, fast growing rate, tolerance for urban stresses⁹ and its autumn foliar display, it is frequently used in urban landscapes and streets⁴. The acorns provide food for migrating mallards and wood ducks⁹, and are an important food source for a number of other animals including deer, squirrels, turkeys, woodpeckers, and blue jays⁴.

Threats and Diseases

Pin oak has thin bark and is particularly susceptible to fire⁸ and to decay associated with fire damage⁷. It is susceptible to most of the diseases of oak including the pathogen *Phytophthora ramorum*^{9, 10} as well as oak wilt (*Ceratocystis fagacearum*)⁸ and several insect species including the gypsy moth (*Lymantria dispar*)⁴.



Greyish-brown bark of the pin oak. (Copyright Bri Weldon, www.flickr.com; CC-BY)

References

- [1] F. Clinovschi, *Dendrologie* (Editura Universitatii Suceava, 2005).
- [2] A. F. Mitchell, *A field guide to the trees of Britain and northern Europe* (Collins, 1974).
- [3] E. F. Gilman, D. G. Watson, Fact sheet ST-555: *Quercus palustris* - pin oak (1994).
- [4] R. A. McQuilkin, *Quercus palustris* Muenchh. *Pin Oak*, Agriculture Handbook 654 (U.S. Department of Agriculture, Forest Service, Washington, DC, 1990), pp. 1366–1377.
- [5] O. Johnson, D. More, *Collins tree guide* (Collins, 2006).
- [6] T. G. M. Sanders, R. Pitman, M. S. J. Broadmeadow, *iForest - Biogeosciences and Forestry* **7**, 61 (2014).
- [7] L. S. Minckler, *Silvical Characteristics of Pin Oak*, USDA Forest Service (1957).
- [8] J. H. Carey, *Quercus palustris*. Fire Effects Information System (1992). <http://www.feis-crs.org/feis>
- [9] D. M. Rizzo, M. Garbelotto, J. M. Davidson, G. W. Slaughter, S. T. Koike, *Phytophthora ramorum* and sudden oak death in California: I. host relationships, *Tech. rep.* (2002).
- [10] C. Brasier, J. Rose, S. Kirk, S. Denman, J. Webber, Comparative host range and aggressiveness of *Phytophthora ramorum* and *Phytophthora kernoviae* sp. nov. on north american and european trees, *Tech. rep.* (2005).

This is an extended summary of the chapter. The full version of this chapter (revised and peer-reviewed) will be published online at <https://w3id.org/mtv/FISE-Comm/v01/e01ec81>. The purpose of this summary is to provide an accessible dissemination of the related main topics.

This QR code points to the full online version, where the most updated content may be freely accessed.

Please, cite as:

Enescu, C. M., Houston Durrant, T., 2016. *Quercus palustris* in Europe: distribution, habitat, usage and threats. In: San-Miguel-Ayanz, J., de Rigo, D., Caudullo, G., Houston Durrant, T., Mauri, A. (Eds.), *European Atlas of Forest Tree Species*. Publ. Off. EU, Luxembourg, pp. e01ec81+



Pin oak in Marburg Botanic Garden (Hessen, Germany). (Copyright Willow, commons.wikimedia.org; CC-BY)