

EUROPEAN OAK CULTIVARS, COLLECTIONS AND COLLECTORS

Eike Jablonski
Ettelbruck Arboretum
Hoesdorf, Luxemburg

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Abstract: Oak cultivars are part of the horticultural heritage in Europe. Among the recorded named cultivars, only a third of them are still in cultivation. An overview is given to show the differences among the cultivars. Historical and present oak cultivars and oak collections are described. The future development of oak cultivars, their biological diversity, and the importance of oak collections are discussed.

Introduction

Some 600 oak species are known to science (GOVAERTS & FRODIN, 1998). From this huge number of oak species, about 240 cultivars of oak have been named (PETZOLD & KIRCHNER, 1864; SCHNEIDER, 1916; BOOM, 1949; 2000; REHDER, 1949; KRÜSSMANN, 1976; MCARDLE & SANTAMOUR, 1985; 1987a&b; JABLONSKI et al., 2001; LÜBBERT, 2001a&b). Although the number of oak species is large, cultivars stem mainly from just a handful of species. About three quarters of all known oak cultivars come from just three European species: *Quercus robur*, *Quercus petraea* and *Quercus cerris* (Figure 1).

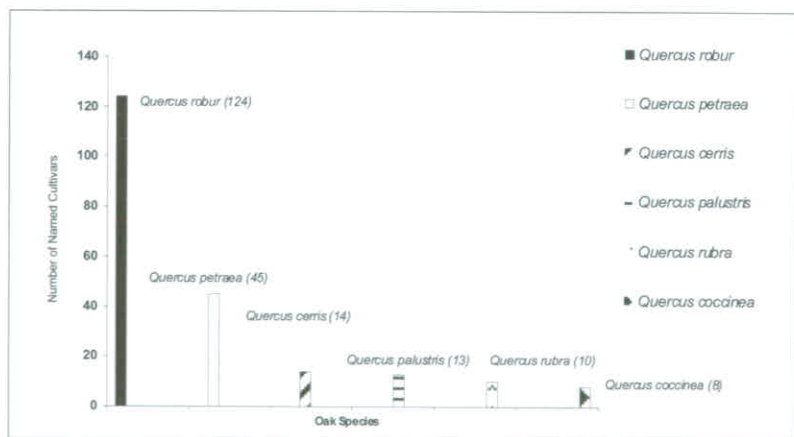


Figure 1: Named cultivars of *Quercus robur*, *Q. petraea*, *Q. cerris* and some American oaks.

Around 40 cultivars also come from American Oaks, e.g. *Quercus rubra*, *Quercus palustris*, *Quercus coccinea*, and *Quercus virginiana*. Interesting enough, the only widely grown oak cultivar in the United States is a cultivar of the English Oak, *Quercus robur* 'Fastigiata'.

Cultivars from several Japanese species are recorded, but most are poorly known outside of East Asia. About ten of them are still in cultivation (КАТОН, 2002). Only one of them is well known in Europe, the beautiful *Quercus dentata* 'Pinnatifida'.

Since the 18th century, different forms of European Oaks, such as *Quercus robur* and *Quercus petraea*, have been documented. Only three oak cultivars were described before 1800: *Quercus robur* 'Fastigiata', 'Pendula' and 'Variegata'. At the time, these selections were not called cultivars in today's sense; they were regarded merely as varieties or forms of a normal tree. From a total of 124 described cultivars of *Quercus robur* known today, 57 were introduced in the second half of the 19th century. This was the epoch of the great plant collectors, who collected not only worldwide, but also in their home forests. They took all that was strange and different, even if the differences were so small that they were difficult to discern! Many of the described cultivars from that time are lost from cultivation today. After the turn of the 20th century, just a few new oak cultivars have been selected, but from 1950 until today, some 40 new *Quercus robur* cultivars have been introduced, some of them with outstanding characteristics (Figure 2).

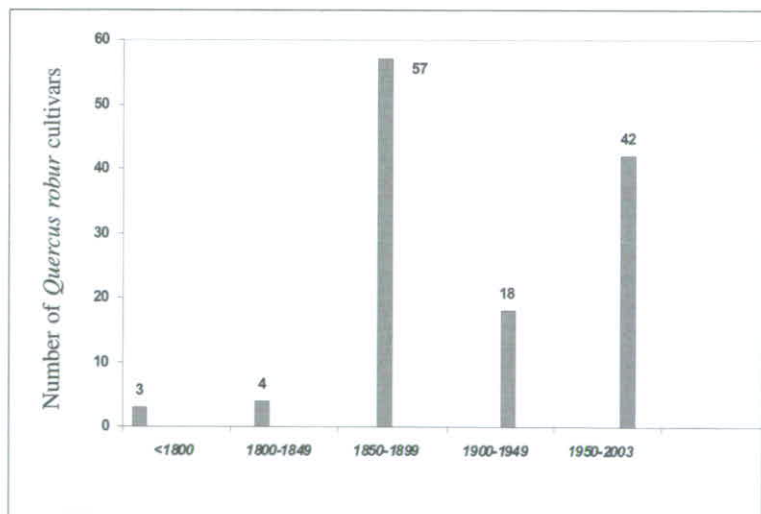


Figure 2: Timetable of the introduction of *Quercus robur* cultivars

The First Cultivars

Forms of the common (English) oak, *Quercus robur*, were probably the first cultivars, in those days treated as varieties or forms, as has already been noted. The first documented oak that differed in form from the norm was an upright form of the English Oak: *Quercus robur* 'Fastigiata'. It was already known in the middle of the 18th century. First descriptions date from 1781 (ANONYMOUS, 1781), and again from 1821 (BECHSTEIN, 1821), but the story starts long before that date.

A fastigate form of *Quercus robur*, growing at the edge of the famous Spessart forest near the small village of Harreshausen, close to Darmstadt in Hesse, has long been known as an unusual form of oak. It was given the name of "The Beauty Oak of Harreshausen". The history of this specific oak started around

1450, when it was a seedling in a dense forest. As a mature and already a vigorous tree, a secondary trunk that was growing out of the crown distinguished it. Around 1700, Duke Reinhard II of Hanau ordered this trunk to be shot (???), which was done by his head forester (CASPARY, 1873). According to the



"The Beauty Oak of Harreshausen" with author standing at the trunk.

photo © Guy Sternberg

French army officer stationed there during the occupation following the Seven Years War collected masses of acorns from this tree around 1759. The fastigiate oaks found in France today may have originated from this oak (SCHENCK, 1916). Years later, when Napoleon's army invaded Hesse and occupied Darmstadt in 1806, the French General in charge placed an armed guard around the tree to protect it from felling, just as it was done some 50 years before by another French Army officer. For decades, this oak also was a landmark on a pilgrimage path, and pilgrims stripped off a piece of the bark and carried a piece of it as a sign of good luck (but not for tree certainly).

Around 1821, the surrounding forest was cut down, but this remarkable oak was spared (CASPARY, 1873). The original height was described in 1781 as some 28 meters (ANONYMUS, 1781). Lightning struck the oak in 1871, and in 1928 a second bolt struck it, shattering more than half of the crown.

This oak is still growing today, in the midst of vegetable fields, still showing the unusual beauty. Although surgical work has recently been done on the tree, it is to be hoped that this exceptional oak will live many more decades.

At the end of the 18th century, unusual plants were a part of the parks and gardens of the nobility. It is known that grafts were made from the "Beauty Oak of Harreshausen", and as early as 1795 Elector Wilhelm I of Hesse-Kassel had planted a grafted tree in the famous park of Wilhelmshoehe at Kassel (JABLONSKI, 1998). This tree is still growing in its original location. Rare or unusual plants were also exchanged among the nobility, and thus it is believed that at that early stage fastigiate oaks from Kassel were distributed all over Europe, and later to America. Seedlings from the two fastigiate oaks at Harreshausen and Kassel were also distributed. LOUDON (1841) shows a drawing of a fastigiate oak in his "*Arboretum et Fruticetum Britannicum*". The fastigiate character is dominant, and the trait of upright growth is passed to progeny: two of three seedlings are always more or less fastigiate, if the mother tree is a fastigiate oak (OPPERMANN, 1932; in McARDLE & SANTAMOUR, 1985).

A variegated oak is also known from this early period. The epithet "variegata" does not clearly distinguish among variegated selections, but it is known that one variegated oak was found around 1770, and a pendulous oak was known as well. As the techniques of grafting were known at that time, it was possible to propagate and distribute such forms.

With the change of garden style, which emanated from Britain around 1800, the parks changed from formal baroque gardens to gardens with more natural landscapes. Parks with this new style were planted with trees such as oaks that did not need to be pruned. At first, the native oaks from the woodlands were planted in the new parks. Later, after more and more exotic plants were introduced (first from North America, and later from Asia), it became increasingly fashionable to collect rare and unusual trees, both exotics from abroad, and unusual forms of native trees. Nurseries also collected more and more unusual forms, which they gathered from foresters and farmers, and plant collectors. The height of the interest in unusual plants was in the middle of the 19th century. Trees that differed even slightly from the norm were selected and propagated. Between 1850 and 1899 nearly 60 new cultivars of the common English Oak *Quercus robur* alone were named, and a large number of forms of *Quercus petraea* and *Quercus cerris* as well. Most of these forms were selected in Germany.

Differences Among Oak Cultivars

Although there are many different oak cultivars, it is possible to put the oak cultivars into groups with certain common attributes. The cultivars differ from the parent species in certain features, such as growth habit (fastigiate, pendulous, creeping, tortuose, horizontal, dwarf, single leader); leaf color (red, yellow, variegated colors), leaf form (lacinate, cucullate, crinkled, bullate, unlobed), or leaf size (smaller, larger), and also certain aspects of autumn coloring. Combinations of the different attributes do also occur, and these attributes are normally easy to recognize. Other important attributes, which are only recognizable after a long-term observation, are such things as tolerance of, or resistance to, pests and diseases, or environmental influences (e.g. nonsusceptibility to powdery mildew; drought resistance, tolerance of high pH).

Some of these groups include a number of different oak cultivars, all with an attribute in common. The fastigate oaks, for example, form a group of some 30 different and named clones. They share the trait of fastigate growth, but differ in their habit (from an extreme narrow growth to a broad upright form), or show different abnormal leaf characteristics. Some are resistant to powdery mildew, while others are not.

Historical Cultivars, Collections and Collectors of Oaks

Wilhelmshöhe and Karlsaue, Kassel (Central Germany):

Not only grafts but also a large number of seedlings from the fastigate oaks in Harreshausen and Kassel were distributed, with the result that many forms of fastigate oaks were named. Today, there exist some good forms of the fastigate *Quercus robur*, one of them found in Kassel "Karlsaue Park", and distributed under the name 'Kassel' by the DÖRING Nursery, Ahnatal. From 1822 to 1864, WILHELM HENTZE was the Garden Director in Kassel. HENTZE was very keen on oaks and presided over one of the richest oak collections of that time, with more than 50 different oaks, many of them cultivars (JABLONSKI, 1999). One of his selections was a slow growing *Quercus robur* with narrow, warped leaves. This selection is still in culture: *Quercus robur* 'Hentzei'. The old oak collections in Kassel include some very rare oak cultivars grown: one is *Quercus robur* 'Macrophylla' with luxuriant foliage; another is *Quercus macranthera* 'Kasseler Gold', an old and until recently little known selection, which was listed in an old handwritten compilation as *Quercus macranthera* 'Aurea' (which is actually an invalid name because it lacks a description). The leaves of this oak show a pure yellow flush in spring, becoming light green in summer. In autumn, a warm golden color distinguishes this cultivar (JABLONSKI, 2000).

Muskau Park, Muskau (Eastern Germany/Poland)

In Muskau, Eastern Germany, 1815 the landscaping Prince Pückler began to create the largest classical 19th century landscape park ever devised. Since 1945, however, the German-Polish border has run through the middle of the park, and now only 200 hectares (494 acres) remain in Germany; the remaining 350 hectares (865 acres) lies in Poland. Pückler had to sell the park in 1845 to Prince Frederick of the Netherlands, who improved the park, with the constant help of Eduard Petzold and Georg Kirchner. In 1864 these men wrote an account of all

trees under cultivation in the Arboretum, which is still an important source for early cultivar descriptions (PETZOLD & KIRCHNER, 1864). Altogether the arboretum housed a collection of some 150 different oaks, many of them forms of *Quercus robur* and *Quercus petraea*. Muskau is one of the first places where oaks were collected systematically, and where all new forms and varieties were brought together. From here, and from the associated nursery, many of the new oak forms or cultivars found their way to other nurseries and parks all over Europe.

Some of the following oak cultivars from Muskau were first described in 1864 by PETZOLD and KIRCHNER:

- *Quercus cerris* 'Argenteo-variegata', a beautiful variegated Turkey Oak;
- *Quercus petraea* 'Cochleata', with blistered, leaves, which appear to be infested;
- *Quercus robur* 'Argenteo-marginta', leaves with an irregular, but sharply defined white border. Sometimes the acorns show also a variation.
- *Quercus robur* 'Pulverulenta', leaves with abundant yellowish-white striations and flecks.
- *Quercus robur* 'Argenteo-picta', with green leaves in spring, but second growth with almost completely white or with white marbled leaves.
- *Quercus robur* 'Atropurpurea', with dark brown foliage. Unfortunately this selection is susceptible to powdery mildew;
- *Quercus robur* 'Crispa', with crinkled dark green foliage and curled margins;
- *Quercus robur* 'Pectinata', with deeply cut leaf lobes, similar to 'Filicifolia';

The yellow English Oak, *Quercus robur* 'Concordia', was also first described by PETZOLD and KIRCHNER (1864). It originated, however, about 1843 at the VAN GEERTS nursery in Ghent, Belgium.

A *Quercus petraea* selection with an unusual, only slightly lobed leaf, still in cultivation, was later named *Q. petraea* 'Muscaviensis'.

Späth Nursery, Berlin, (Eastern Germany)

After the liquidation of the Muskau park nursery, the Späth Nursery, which was the largest nursery in the world around 1900, bought the complete oak collection of Muskau, together with many other woody plants. The Späth nursery introduced a large number of oaks, and many new cultivars, such as the *Quercus petraea* 'Giesleri', one of the cultivars of the sessile oak with narrow, almost unlobed leaves (SPÄTH, 1912; 1930). Another oak cultivar introduced by Späth is:

Quercus robur 'Fürst Schwarzenberg', with normal leaves in spring, but the second growth of shoots with white spots and pink leaves at the top of the second shoot. Unfortunately, this beautiful cultivar is very susceptible to powdery mildew. The Späth nursery still exists today. Several interesting oaks are present in their arboretum, but none of the famous cultivars is still there.

Hesse Nursery, Weener (Northern Germany)

In northern Germany, the Hesse nursery was nearly as large as the Späth Nursery in Berlin. With their huge assortment of tree varieties, this nursery was known world-wide. Unfortunately, the nursery had to close in 1992 because of fiscal difficulties. Around 1925, the nursery cultivated some 100 different oaks. One well-known oak cultivar introduced by Hesse, and still in cultivation, is:

Quercus petraea
'Laciniata Crispa', a wonderful tree with very unusual foliage; the first shoot is nearly normal, followed by a second growth with more or less irregular lobed and incised leaves, often extremely narrow and drawn out in length. This beautiful cultivar occurs quite frequently in European collections.



Q. x rosacea 'Columna'

photo © Guy Sternberg

Hesse also introduced the interesting hybrid *Quercus x rosacea* 'Columna', with *Quercus petraea* 'Muscaviense' and *Quercus robur* 'Fastigiata' as parents. The fastigiata growth, combined with the large, oblong, narrow leaves, makes this an excellent cultivar. It is far more resistant to powdery mildew than most fastigiata English oak cultivars.

Arboretum Malonya (Mlynany), Austria-Hungary (Slovak Republic)

In 1892, the Hungarian Duke ISTVAN AMBROZY-MIGGAZZI founded an Arboretum at Malonya, a small town in the northern part of the Hungarian Plain. His aim was to create a park mainly with evergreen woody plants, and he started to collect and to plant every evergreen plant he could find. His motto "Semper Vireo" is still to be seen at the entrance of his castle amidst the park. Together with his excellent head gardener, JOSEF MISAK, he tested the plants brought from all over the world, mainly for winter hardiness. His main object was to collect *Rhododendron* and *Prunus laurocerasus*, but he also assembled a number of evergreen or wintergreen oaks (MISAK, 1925; TABOR & PAVLACKA, 1992). Of the many oaks he tried and selected, two cultivars were named after him:

Quercus x hspanica 'Ambrozyana' (by some still recognized as a variety of *Quercus cerris*), a nearly evergreen form, and *Quercus pubescens* 'Miggazziana', a semi-evergreen form. Both of them are still in cultivation and available in the trade. Contemporary cultivars, collections, and collectors of oaks

At the present time, a few important oak collections are based in continental Europe, and several nurseries specialize in oaks. Also, some new oak cultivars have been established recently at Arboretum Trompenburg, Rotterdam (The Netherlands). The finest present-day European collection of oaks is at the Arboretum Trompenburg in Rotterdam, The Netherlands. J.R.P. VAN HOEY SMITH, former owner of the Arboretum Trompenburg (which is now a foundation), has a keen passion for oaks. He bought his first oaks in 1939 from the Hesse Nursery in Germany. These oaks are still growing in Trompenburg, together with some 260 others, all different, of which more than 100 are cultivars (HOEY SMITH, 1992; 2001). Many of the older cultivars are growing there, but VAN HOEY SMITH has always sought and introduced new oaks, many of them commercially available. Some of his introductions are:

- *Quercus castaneifolia* 'Zuiderpark', a beautiful form of the *Quercus castaneifolia*, with unusually deeply incised leaves. Originally found at Zuiderpark in Den Haag, this tree is now in cultivation.
- *Quercus cerris* 'Marmor Star', a stable yellow variegated *Quercus cerris*.
- *Quercus x libanensis* 'Rotterdam', a hybrid of *Quercus cerris* x *Quercus libani*, which has a central leader, making it suitable for street planting. The leaves are like those of *Quercus libani*, the growth like *Quercus cerris*: thus uniting the best characteristics of the two parents.
- *Quercus ilicifolia* 'Tromp Ball', a dwarf selection of *Quercus ilicifolia*, a 40-year-old shrub of distinctly slow and compact growth; it reaches 1.8 meters in height.
- *Quercus montana* 'Laciniata', with deeper lobes, originally from a tree cultivated at the Arnold Arboretum in Boston, Massachusetts, U.S.A.
- *Quercus robur* 'Salfast', an interesting upright oak, with entire leaves of the old cultivar 'Salicifolia' and fastigiate growth. This is a seedling of *Quercus robur* 'Fastigiata' and *Quercus robur* 'Salicifolia'.
- *Quercus robur* 'Strypemonde', a selection made already by van Hoey SMITH's father from a tree growing at their estate Rockanje; it has incised and curled leaves, similar to the old cultivars 'Fennessii', 'Hentzei' and 'Heterophylla Cucullata'.

- *Quercus robur* 'Tromp Dwarf' is a promising slow growing selection of a seedling from *Quercus robur* 'Cristata', forming a globular little shrub. After 25 years, it has reached just about one meter in height.
- *Quercus x rosacea* 'Eastcolumn' and 'Westcolumn', two fastigate selections with compact growth, originating from seedlings of *Quercus x rosacea* 'Columna'. They are planted together and named for their respective positions in the Arboretum.
- *Quercus* 'Pondaim', a hybrid of *Quercus dentata* and *Quercus pontica* now 50 years old, with good healthy foliage and vigorous growth, suitable for large gardens and parks.
- *Quercus* 'Macon', also a hybrid, the parents are *Quercus frainetto* x *Quercus macranthera*. This cultivar, now 50 years old, shows vigorous growth as well as very healthy foliage.

Arboretum Hemelrijk, Essen (Belgium)

In Northern Belgium, Baroness JELENA and Baron ROBERT DE BELDER, co-founders of the International Dendrology Society, created the Arboretum Hemelrijk from 1960 onwards. Some old oak cultivars were already planted, such as a huge *Quercus robur* 'Pendula'. As keen plant people, they have collected a



The old *Quercus robur* 'Pendula' at Hemelrijk, perhaps the largest in the world

photo © Guy Sternberg

large number of woody plants, including many oaks. They gathered acorns from their trips to all over the world, especially from Asian countries such as South Korea and Japan. Some of their seedlings with outstanding characteristics have been selected and are in cultivation now:

- *Quercus dentata* 'Carl Ferris Miller' is a selection of the Daimyo Oak from South Korea. This cultivar shows a vigorous growth, a good hardiness, and has healthy, leathery foliage.
- *Quercus dentata* 'Sir Harold Hillier', another selection of the Daimyo Oak with good hardiness and a rich orange to golden autumn color. Both Daimyo Oaks originated from seedlings. The acorns were gathered on a tour to South Korea, which the de Belder's made together with Mrs. and Mr. Harold Hillier from England.
- *Quercus ithaburensis* subsp. *macrolepis* 'Hemelrijk Silver' is a hardy selection of this Mediterranean oak, with luxuriant foliage. New shoots and leaves are remarkably silvery because of their dense indumentum.
- *Quercus ellipsoidalis* 'Hemelrijk'; this selection shows exceptional dark red autumn color.

Waasland Arboretum, Nieuwerkerken (Belgium)

Michel Decalut, a former sailor with an interest in plants, founded the Waasland Arboretum in 1972. He started to collect all woody plants he could find in nurseries and collections, and planted them around his house. Nowadays the Arboretum Waasland and nursery lists some 3500 different plants, including some 150 different oaks. Some of them are their own selections. These include:

- *Quercus x hispanica* 'Waasland Select', a seedling of *Quercus cerris* x *Quercus suber*, the cork oak, with small incised leaves, which persist on the tree in winter, and good hardiness.
- *Quercus cerris* 'Waasland Compact', a compact and slow growing form of *Quercus cerris*, which reaches 5 m height in 25 years. It is a suitable selection for the smaller garden.
- *Quercus trojana* 'Fragno', with curled leaves, a seedling from acorns gathered at Kew Gardens.

Poznan Botanical Garden, Poznan (Poland)

In Poland, nurserymen and the Polish Institute of Dendrology have produced a few oak cultivars. In the Botanical Garden of Poznan, the following Polish cultivars can be found:

- *Quercus* 'Monument', a newly introduced cultivar is a hybrid with upright growth. The parents are thought to be *Quercus macranthera* and *Quercus robur* 'Fastigiata'. Leaf characters are intermediate between *Quercus macranthera* and *Quercus robur*, dark green, thick and not susceptible to powdery mildew (JERZAK & ZIELINSKI, 2002).
- *Quercus robur* 'Jan Zamoyski', a beautiful variegated English Oak, unknown in cultivation in Western Europe, but already known in 1903 at the Podzamcze Nurseries in central Poland.

Bömer Nursery, Zundert (The Netherlands)

JO and MAARTEN BÖMER founded the M.M.Bömer Nursery in 1966 in Zundert, Southern Holland. They began specializing in Chestnuts, Ginkgos and other Conifers, but became more and more interested in Beeches (*Fagus*) and Oaks. Because of their close contacts with collectors all over Europe, they have gathered a huge collection of oaks, including many rare and unusual forms, and introduced numerous new cultivars. Some of these are the following:

- *Quercus robur* 'Irtha', with curled and incised leaves, similar to those of 'Strypemonde'
- *Quercus robur* 'Miki', with deeply incised leaves, of uncertain origin. In fact, this oak so different from the normal form of English Oak that the cultivar was for some time treated as a red oak cultivar. This selection is originally from Hungary.
- *Quercus robur* 'Gyor', a slow and very narrow-growing fastigiate selection, found in Hungary in the city of Gyor.
- *Quercus robur* 'Hof ter Saksen', found by Maarten Bömer at the Belgian Park at Hofter Saksen. It is a selection with an outstanding and regular crop of fruits, the acorns larger than normal. It is a selection for fruit production, and therefore, as Maarten says, "good for the pig farmer".
- *Quercus cerris* 'Curly Head' is a slow growing selection of the Turkey Oak, with curled, small, deep green foliage. This is a promising new cultivar as it is suitable also for the small garden. Grafted on a rootstock or on a standard, it makes a beautiful addition to the oak assortment. It was found by M. Bömer as a chance seedling.
- *Quercus cerris* 'Summer Vale' is another outstanding selection of the Turkey Oak, with deeply lobed and incised leaves, better than many existing forms. This oak is also a chance seedling, found by M. Bömer.
- *Quercus rubra* 'Vana' shows an extraordinary leaf variation that is very stable. This is one of the American oak cultivars raised in Europe; this one originated in Belgium.
- *Quercus rubra* 'Haaren' is a dwarf selection of the American Red Oak. It was found as a witches broom in the city of Haaren, The Netherlands.



Plate 2. Foliage of *Q. Cerris* 'Summer Vale'

photo © Guy Sternberg

Döring Nursery, Ahnatal/Kassel, Germany

In 1957, the DÖRING nursery was founded in Ahnatal, a small village close to Kassel in Central Germany. Now maintained by the third generation, all of the DÖRINGS collected and propagated rare and unusual plants. Since 1981, oaks are one of the specialties there. Today the oaks in cultivation number about 160 different ones. Close to Kassel, Dieter Döring is propagating many of the old cultivars from Kassel and Muskau. Anyhow, he also introduced a number of his own selections, such as:

- *Quercus rubra* 'Boltes Gold' is a seedling of the Golden Red Oak, *Quercus rubra* 'Aurea'. The leaves are thick and leathery, and this oak can thus be planted in full sun without risk of burn on the leaves. This one was introduced by M.M. Bömer as well.
- *Quercus petraea* 'Lanze' is a seedling of *Quercus petraea* 'Mespilifolia'. It shows slower growth and smaller foliage than 'Mespilifolia' or the old cultivar 'Muscaviense'.

Oak Cultivars for the Future

What can be expected regarding oak cultivars in the future? Is there any reason to seek new forms of oaks? It must be admitted that nurserymen and collectors are always eager to find something new. If it is better than an existing plant, it will be taken into culture, and will become available in the trade. A new cultivar with outstanding characteristics can also be of economical interest for the producer. According to HATCH (1998), there are multiple reasons to find new ornamental plants, such as unusual or new combinations of certain attributes, or better propagation possibilities for the producer. In addition to new forms of oaks with unusual foliage or growth habit, resistance to pests, diseases and environmental changes would be very desirable. Today, there is a demand for several particular characters in oaks:

- **Leaf characteristics:** yellow leaves which do not burn in the sun (e.g. *Quercus rubra* 'Boltes Gold'); red leaves not fading to green during the summer (*Quercus robur* 'Timuki', an oak with red foliage not fading out, introduced by Bömer), remarkable variation (*Quercus rubra* 'Vana' or new *Quercus palustris* seedlings); remarkable incised leaves (*Quercus robur* 'Miki'; *Quercus cerris* 'Summer Vale'); but also exceptional autumn color, which is shown by the cultivars *Quercus ellipsoidalis* 'Hemelrijk' (from de Belder), *Q. coccinea* 'Splendens' and *Q. rubra* 'Magic Fire' (introduced by Bömer).



Q. x reifii var. *warei* 'Windcandle'

photo © Guy Sternberg

- **Growth habit:** smaller gardens need smaller plants: *Quercus robur* 'Gyor'; *Quercus robur* 'Tromp Dwarf' and *Quercus cerris* 'Curly Head' (this three already mentioned); or *Quercus palustris* 'Swamp Pygmy' and 'Green Dwarf', two dwarf selections of the Pin Oak by Bömers. Other promising selections are made at Bömer's nursery, such as dwarf growing seedlings of *Quercus cerris*, *Quercus palustris* or *Quercus robur* 'Fastigiata', all without a cultivar name yet.
- **Resistance to stress, pests and diseases:** *Quercus x reifii* var. *warei* 'Windcandle' (a selection made by Guy Sternberg, Illinois, for upright growth and good resistance to powdery mildew. It is a hybrid of *Quercus bicolor* and *Quercus robur* 'Fastigiata'); *Quercus* 'Monument'
- **Suitability for street planting (i.e. showing a central leader and/or vigorous growth):** *Quercus robur* 'Alpha' and 'Beta', *Quercus frainetto* 'Trump', all three Dutch selections that show a good central leader (GROOTENDORST, 1980).

The Importance of Oak Cultivar Collections

Oak cultivars belong to the European horticultural heritage. Despite the vast number of oak cultivars, which have been named, only a third are still in cultivation and commercially available from specialized nurseries (Figure 3). For example, 124 clones of *Quercus robur* are named (from which about 25 named clones are not commercially available and only a mother plant in the nursery is existing). Only about 40 of them are still growing in living collections, and 33 of them are still available in the trade. In the regular nursery trade, both in Europe and the United States, only one oak cultivar plays a major role: the fastigate English Oak.

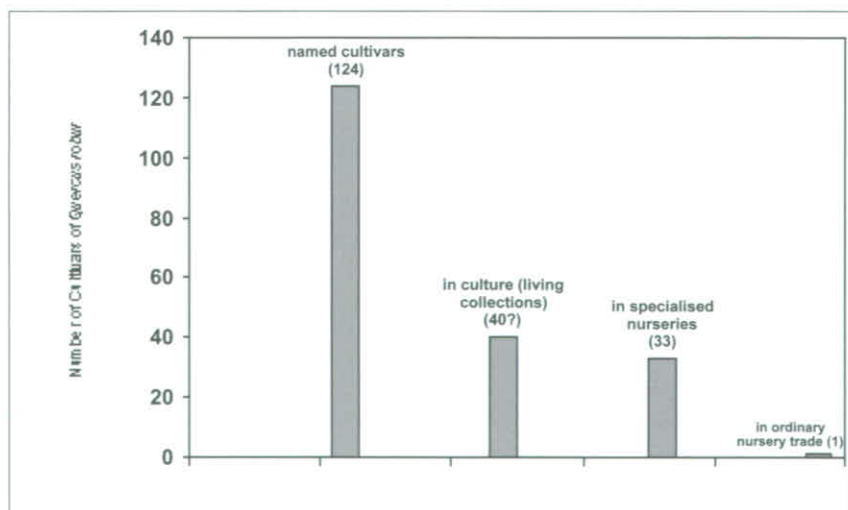


Figure 3: Cultivars of *Quercus robur* (named, in collections, and in nurseries)

Oaks are not longer a part of the modern European garden inventory. They are simply too large for small European gardens. Where space is available, in public parks or Botanical Gardens, the policy is different: in public parks today the planting of indigenous trees is favored. The preference for indigenous trees, the lack of money for trees from specialized nurseries, and perhaps a lack of sophistication on the part of landscape architects, make it highly unlikely that selected oak cultivars will be planted in today's public plantations.

Botanical Gardens in general have the policy of planting only wild collected material or material of known wild origin, an understandable policy when the purpose is scientific. These taxa are normally pure species, not cultivars. According to Menzel (2001) and Schwarz (2001), it is important for the future to conserve collections of ornamental plants such as of oaks and their cultivars, but also to watch for potential new collections. There are several reasons for this. These include: *horticultural history; horticultural tastes; breeding catalogs and other information on propagation; information about tolerance and resistance to environmental stress, pests and diseases; and comparison of similar cultivars*. Reference collections for oak cultivars should be planted in at least two or three different locations and countries, with different ecological, edaphic, and climatic characteristics. Data from such controlled plantings will be of immense value in the future as mankind adapts nature to his ongoing practical and aesthetic needs.

Summary

Already since the end of the 18th century, unusual forms of oaks have been collected. Today some 240 cultivars of oaks are known, many of them no longer in cultivation. The height of the interest for oak cultivars was around 1850, when forms with even a little difference were selected. Oak cultivars may be put together in groups or sections with certain attributes in common, as it is done with the fastigate forms of *Quercus robur*. Anyhow, single clones with exceptional characteristics should be carefully separated. Today's new cultivars have to have striking attributes, or they have to be resistant or tolerant to stress, pests and diseases, if they shall be of economical interest for nurserymen. Presently, oak cultivars are not widely planted, for several reasons. Although there is concern about the future of oak collections, enthusiastic private collectors play an important role in the conservation of oaks.

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