

English Oak (*Quercus robur* L.) in Shakinskaya Dubrava, Russia The Southeastern extent of its Natural Distribution

Gennady A. Firsov and Vjacheslav V. Byalt
Komarov Botanical Institute,
Government of St. Petersburg, Russia

English Oak (*Quercus robur* L.) is a major forest tree species in the European province of Russia. It is also one of the favorite trees of the Russian people, held sacred even before the era of Christianity. The northern border of its natural range passes near Saint-Petersburg, and reaches the Ural Mountains at the east. At the southeast, it reaches Saratov and Volgograd, and then reaches Novocherkassk and the mouth of Dnieper River. English oak is absent within the dry steppe, but appears again at the foothills of North Crimea and North Caucas (Sokolov, 1951; Sokolov, 1977). At the northern part of its habitat it grows in river valleys, and to the south it occurs as well within watersheds as a component of mixed conifer-broadleaved forests, often with spruce (*Picea abies*). At the very south of its natural distribution it forms pure oak woodlands. At the steppe zone of Russia the English oak is the dominant forest tree and is very common in the afforested steppe ravines, on black soils (Figure 1). Associate tree species in such oak woodlands include *Tilia cordata* (more common in the east than west), *Acer platanoides*, *A. campestre*, *Ulmus campestris* and *Populus tremula*. Understory and shrub layers include *Corylus avellana*, *Euonymus verrucosus*, *E. europaeus*, *Prunus spinosa*, *Padus avium*, *Acer tataricum* and *Crataegus rhipidophylla*. The herb layer is diverse (Figure 2), with many species flowering before the appearance of spring foliage on the trees, finishing their annual growth cycles by the second half of summer – the forest floor then is covered with browned and fallen leaves and seems lifeless.

In Russia, contrary to Western Europe, there are still large expanses of oak woodland intact. It is well known that the English oak is a highly valuable tree, very important for common people in everyday life and having a variety of utilitarian uses. The oak is a very decorative tree and often planted in different places throughout the European part of Russia. It is used in forestation projects in steppe zones and in creation of forest belts to protect agricultural fields. The dispersion of English oak has long been connected with human activity. After the Second World War there was Stalin's plan of nature transformation, a period when millions of hectares of artificial forests were planted, including plots of oak forest. It was at that time when the majority of forest belts of different political levels (from local to all-Union significance) were established. The English oak was among the most important of all planted trees.

Shakinskaya Dubrava (Shakinsky Oak Wood) is a place where the English oak grows in the wild, not far from the southeast border of its natural distribution, and in this locale helps to promote a rich set of local flora. Here is upland forest, in contrast to floodplains (where *Quercus robur* is also one of the main tree species). Shakinskaya Dubrava represents a large massif of forest, about 15 x 20



Figure 1. Powerful Oak in the Shakinskaya Dubrava.

km, occupying 6340 hectares. This is a local monument of nature with regional significance, and it is one of the highlights of the newly established Lower Choper Nature Park (Ponomareva et al., 2004; Firsov, Ponomareva, 2004; Byalt et al., 2007; Byalt, Firsov, 2007). The Dubrava is situated at the northwestern part of the Volgograd region, at Kumilzhensky administrative district, near Khutor (Cossack village) Shakin, 270 km north-west of Volgograd, penetrating into the territory of adjacent Rostov region. Since 2003, it is part of the newly established Lower Choper Nature Park, with geographic coordinates 49°42' - 49°49' N and 42° 06' - 42° 14' E.



Figure 2. *Tulipa biebersteiniana* in the Shakinskaya Dubr.

Shakinskaya Dubrava is the southern plot of oak forests in Volgograd region, containing certain trees more than 200 years old. The place is situated at the south-western edge of the Kalach Hills, about 150 m elevation (maximum height is 202 m elev, close to Dubrava) and characterized by extensive soil erosion. Shakinskaya Dubrava is supervised by the Shakinsky Forest of Kumilzhensky Experimental Forest Enterprise. *Quercus robur* dominates among the native trees, while *Pinus sylvestris* is another common species, being introduced and widely planted here in the southeastern border of its natural distribution (Figure 3). There are also associates such as *Fraxinus excelsior*, *Acer campestre*, *A. tataricum*, *Malus praecox*, *Tilia cordata*, *Salix alba*, *Alnus glutinosa* and *Ulmus glabra*. In most of the oak forests, rich growths of grasses occur, including species such as *Dactylis glomerata*, *Melica picta*, *Poa nemoralis*, *Carex pilosa* and *C. michelii* (Figure 4). There are considerable quantities of *Ulmus campestris*, *Acer tataricum* and *Rhamnus cathartica* on ravines and *Alnus glutinosa* along wet places and streams. At the borders with steppe area, there are oak stands of low productivity, apparently due to intensive cattle grazing and cutting. The stock of oak timber is about 70-90 cubic m per hectare, and of pine the stock is somewhat greater, about 110-150 cub. m/ ha.

This forest is very unusual for a steppe zone with dry continental climate. The rich and unique flora has not been fully investigated till recently. Some plant rarities found here include the orchid *Epipactis atrorubens*; bulbs *Fritillaria ruthenica*, *Scilla sibirica* (Figure 5), *Ornithogalum kochii* and *Tulipa biebersteiniana*; perennials *Iris pumila*, *Gladiolus tenuifolius*, *Pulsatilla patens*; the succulent *Sempervivum ruthenicum*; trees and shrubs such as *Crataegus ambigua*, *Cerasus fruticosa* and *Chamaecytisus ruthenicus*. Common western



Figure 3. Landscape of the Shakinskaya Dubrava

European trees such as *Acer campestre*, *A. platanoides* and *Salix caprea* grow here at the southeastern border of their natural distribution.

Oak woods of the steppe zone of Russia have been considerably touched by cutting in recent decades and centuries, when the area along Choper and Don rivers began to be settled actively by Cossack people since the 16th and beginning of the 17th centuries. Most of the oak trees now exist in a rather poor state, in second- to third-growth or more vegetative generations, reproducing themselves vegetatively after cutting. There are not so many old oak trees originating from natural seed reproduction, but several such oaks we were able to find at Shakinskaya Dubrava,



Figure 4. Shakinskaya Dubrava, an open glade in summer.



Figure 5. *Scilla Sibirica* in the Shakinskaya Dubrava.



Figure 6. Slava Byalt near an old large stump of dead oak.

apparently more than 200-250 years old. It is often possible to see, under the canopy of forest or on the glades, huge dead stumps, cut off and dead long ago, more than 1.5 m in diameter; apparently these trees were of great age (Figure 6).

The influence of large forest tracts among the dry and hot open steppe and the presence of varied ecological conditions provide a basis for the rich diversity of vegetation. It is here the steppe and forest species grow close to each other, which is absolutely not typical for more northern oak woodlands (Figure 7). It is here where the range borders of many species lie (Byalt, Firsov, 2006; Firsov, Byalt, Grishin, 2007; Firsov, Byalt, 2007).

It should be stressed that the floral significance of Shakinskaya Dubrava comes from a presence of species which are more typical for more northern territories. These include woody species such as *Rubus saxatilis*, *Frangula alnus*, *Sorbus aucuparia* and *Berberis vulgaris*. Common rowan (*Sorbus aucuparia*) is widely cultivated throughout, but very rare in the wild at this territory; apparently, Shakinskaya Dubrava is the southern point of its natural distribution. This is also true for perennials such as *Filipendula ulmaria*, *Campanula latifolia*, *Mycelis muralis*, and many others. There are interesting cryptogamous plants as well,



Figure 7. Old Oak at the edge of the Shakinskaya Dubrava.

rare for the steppe region. These include horse-tails (*Equisetum sylvaticum*, *E. hyemale*) and ferns (*Cystopteris fragilis*, *Dryopteris carthusiana*, *D. cristata*, *D. filix-mas*, *Pteridium aquilinum*, *Athyrium filix-femina*).

The general flora of Shakinskaya Dubrava is unique. As for groups of rather rare angiosperm plants which are rather fully represented at Dubrava, we can enumerate *Echium maculatum*, *Scilla sibirica*, *Orobus vernus* and *Adonis wolgensis*. There are also many rare and threatened bulbs, orchids and perennials which are officially listed to the Red Data Book of the Volgograd region: *Anemonoides ranunculoides*, *Muscari neglectum*, *Laser trilobum*, *Epipactis atrorubens*, *E. helleboline*, *Platanthera bifolia*. This place is obviously interesting for botanists, and it has been visited by botanists from Volgograd, Moscow and Rostov at intervals. Several interesting articles were published on interesting botanical discoveries (Drobov, 1906; Zozulin et al., 1968; Skvortsov, 1971; Sagalaev, 2004a, 2004b). The authors of this article also visited Shakinskaya Dubrava many times in 1999-2007 to study its flora. The work was partly supported by Fauna and Flora International (project 99/50/1) and the Rufford Small Grant (project 41.01.05). More than 800 herbarium specimens were collected. Following analysis of all available data, including literature searches and the Herbarium of the Main Botanic Garden in Moscow (MHA), the preliminary list of vascular plants of Shakinskaya Dubrava has been compiled. At present this list includes about 650 species, of 5 divisions (*Polypodiophyta*, *Equisetophyta*, *Gnetophyta*, *Pinophyta*, *Magnoliophyta*), including 71 families and 268 genera.

The forest is a refuge for many threatened species (Byalt, Firsov, 2006; Byalt et al., 2007; Byalt, Firsov, 2007). There are 14 species in common with the Red Data Book of the Volgograd region (2006), which contains about 9%

of total amount of protected plants (157 species): *Bulbocodium versicolor*, *Muscari neglectum*, *Epipactis helleborine*, *E. atrorubens*, *Iris aphylla*, *I. pumila*, *Campanula rapunculus*, *Allium regelianum*, *Platanthera bifolia*, *Sempervivum ruthenicum*, *Pulsatilla pratensis*, *P. patens*, *Fritillaria ruthenica* and *Gladiolus tenuis*. Moreover, 5 of these are also found in the Red Data Book of Russian Federation (1988): *Allium regelianum*, *Bulbocodium versicolor*, *Fritillaria ruthenica*, *Iris aphylla*, *I. pumila*. The sixth species of the Red Data Book of Russia, *Tulipa schrenkii*, grows close by to Dubrava, at surrounding steppe areas of the right bank of the Choper River. Among plants of Dubrava there are endemics and threatened species, disappeared in many other places of the European section of Russia, not yet officially included in the Red Data books of Volgograd region and of Russia. As a rule, these are species which grow at the border of their natural habitat. We can enumerate *Campanula trachelium*, *C. persicifolia*, *C. latifolia*, *Lysimachia verticillaris*, *Peplis alternifolia*, *Geranium robertianum*, *Centaurium meyeri*, *Elatine alsinastrum*, *Dianthus squarrosus*, *Impatiens noli-tangere*, *Asarum europaeum*, *Allium savranicum* and *Ornithogalum kochi*. Such rare species as *Campanula cervicaria* and *Allium scorodoprasum* may be particularly recommended for inclusion to the Red Data Book of Volgograd region. In general, the human pressure is currently low, flora is rich and deserves to be conserved and further studied.

Certain old oak trees throughout Shakinskaya Dubrava have been found following careful examination; currently all of these are protected. A considerable portion of prominent trees has yet to be discovered, checked and mapped. Several old trees grow close to Shakin village, while others are far from the people's sight, hidden in the thicket of wood. In August 2005, one such magnificent and very old tree was kindly shown to us by a local forest man and forest guard, the enthusiastic nature lover Mr. Vladimir Kharitonov (Firsov, 2006). He discovered the tree recently while hunting for wild boar, several kilometres from Khutor Shakin (Figure 8). We visited the tree in a shortened excursion during the dangerous fire season, and were not able to measure this tree, only to be amazed and take pictures (Figure 9). One can imagine of what immense age it may be, keeping in mind that it likely has grown very slowly at the border of its natural habitat, and at extremely dry and severe conditions. Several other very old trees we discovered in the next two



field seasons of 2006-2007, during botanical excursions crossing Dubrava in different directions.

As for other oak species, only one of them, *Quercus rubra*, the introduced

Figure 8.
Vladimir Kharitonov near the oak which he discovered.



Figure 9. Largest oak in the Shakinskaya Dubrava.



Figure 10. Old Oak in the Shakinskaya Dubrava at the beginning of the summer.

oak from North America, is used in forestation in very limited scale. We discovered it only once at Nekhaevsky district, at the northern part of the Park, planted as a small forest belt at the upland forest along right bank of the Choper River. There is only the native *Quercus robur* seen in plantings of streets, parks and gardens of local Cossack settlements; we have never seen any other oak species. Such low oak diversity may be apparently explained by an absence of arboreta and botanic gardens at the northwestern Volgograd region. Only recently has the situation begun to change. The new private nursery of local enthusiast Mr. Sergey Grishin has been established at Chunosov village, and he wishes to expand the local assortment of trees and shrubs in settlement plantings.

Shakinskaya Dubrava was considerably damaged after the Second World War. It was then partly afforested using pines instead of oaks. After the Stalingrad Battle in the Second World War, when Stalingrad (now Volgograd) was completely destroyed and laid in ruins, most old oak trees at Shakinskaya Dubrava were cut by German prisoners of war to rebuild Stalingrad. Luckily, certain oak trees escaped such fatal fate and nowadays, more than 60 years later, there is an interest (maybe with help from The International Oak Society), to estimate and measure the condition and age of these surviving old oaks and aid their conservation. The oldest and largest of these unique trees deserve to be included into the European data base for significant ancient trees.

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