

## FACTS AND FIGURES

Petra Štochlová

### Definitions

(1) low coppice forest - forest management system in which trees originate from sprouts

*(1) nízký les (pařezina) - hospodářský tvar lesa vzniklý výmladností*

(2) coppice with standards - forest management system in which trees coming from sprouting and individuals originating from seeds are combined

*(2) střední (sdružený) les - hospodářský tvar lesa vzniklý jako kombinace výmladkové složky a jedinců semenného původu*

(1) & (2): Decree of the Ministry of Agriculture of the Czech Republic no. 83/1996 Coll. on elaborating regional plans of forest development and on specification of economic complexes

(3) stand of fast-growing trees (short rotation coppice; SRC) - cultivated agricultural land with permanent culture that is uniformly planted with at least one thousand woody plants per ha including handling area that cannot exceed 12 m on both sides of the rows and width of inter-row along the edge rows

*(3) porost rychle rostoucích dřevin (výmladková plantáž) -zemědělsky obhospodařovaná půda s trvalou kulturou, která je rovnoměrně a souvisle osázena dřevinami, a to v minimálním počtu 1000 životaschopných jedinců na 1 hektar dílu půdního bloku, do plochy této zemědělsky obhospodařované půdy se započítává související manipulační prostor, který nesmí přesahovat 12 metrů na začátku a na konci řad a šířku jednoho meziřadí, v nejvyšší započítatelné šířce 8 metrů, podél řad po obou stranách rychle rostoucích dřevin pěstovaných ve výmladkových plantážích a tvoří součást cesty*

(3): Government decree no. 307/2014 on land use records keeping

### Legal Framework

Act no. 289/1995 on Forests defines forest as a forest stand with its environment and land designated for the fulfillment of forest functions. It defines the minimum age of trees to be felled (80 years); earlier felling is only possible with an exemption or in a special forest management sets of stands. Management sets are mean units used to differentiate between management methods in forests set out within individual natural forest areas and based on their function, natural conditions and state of forest stand. There are 24 management sets (and 3 for protecting forests); 6 of which include coppice.

Decree of the Ministry of Agriculture of the Czech Republic no. 83/1996 on elaborating regional plans of forest development and on specification of economic complexes - defines coppice forests and 6 forest management sets of stands where coppice forests can be grown and the age when they can be harvested.

Act no. 252/1997 on agriculture - SRC is defined as one of the crops that can be grown on agricultural land.

Act no. 334/1992 on protection of agricultural land resources - restricts growing SRC on agricultural land of I. and II. protection category; defines the maximum rotation length (10 years) and maximum growing period (30 years) for SRC; the land must be used in the different way 3 years after SRC removal.

Act no. 114/1992 on the Conservation of Nature and Landscape - growing allochthonous plants (mainly hybrid poplars) is possible only with permission; they are banned in protected areas.

## Rotation Period

For (1) & (2): According to Czech law Act no. 289/1995 on Forests most forests cannot be felled before the age of 80. Simple coppice management is only allowed in six forest management sets of stands. Coppice forests with a predominance of hardwood trees are definitely preferred and have a recommended rotation length of 40 years (with a range between 30-50 years, in some cases 60 years). In coppice forests with a predominance of soft wood trees, the recommended rotation length is between 20 and 30 years. The recommended rotation length for willow forest cover and locust forest cover is 40 and 70 years, respectively, in specific forest management sets of stands.

For (3): Agricultural land can be used for growing woody plants of up to 10 years. However, SRC grown on agricultural land has a maximum of 30 years with rotation periods up to 10 years.

## Typology

<b>Simple coppice</b>	Allowed in 6 forest management sets of stands. Species: alder, oak, hornbeam, maple, ash, elm, lime, poplar, willow (wild cherry tree, birch, rowan tree)
<b>Coppice with standards</b>	Mainly with sessile or common oak or common or narrow-leaved ash as standards
<b>Pollarding</b>	Not practised
<b>Short rotation coppice</b>	Mainly <i>Populus</i> , <i>Salix</i> , minimally <i>Alnus</i> or <i>Fraxinus</i>

## Images

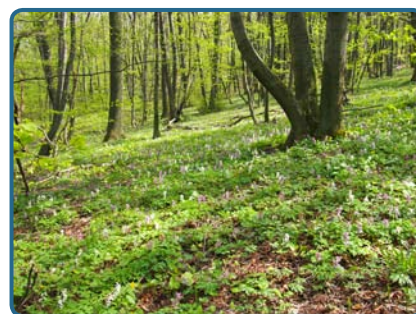
### Simple Coppice



Coppice stools



Thinning of a coppice stand



Coppice stand vegetation  
(Photos: Radim Hédl)

### Short Rotation Coppice



Black poplar plantation in the first vegetation period



Black poplar plantation in the last vegetation period before 2<sup>nd</sup> harvest (6,061 plants per ha, 3 year rotation)



Sixth harvest in black poplar plantation (2,222 plants per ha, 3 year rotation)  
(Photos: Petra Štochlová & Kateřina Novotná)

## MAP

Radim Hédl

### Extent of coppicing in the Czech Republic

Currently, there are only six sites in the Czech Republic where coppicing has been restored in about the past decade (since 2007-2008). Altogether, they comprise up to 20 ha of freshly restored coppices and have only gone through one cutting (Fig. 1, black stars). Prior to that, there were no active coppices for the whole second half of the 20<sup>th</sup> century. Coppices were

deliberately transformed to high forest by singling-out of coppice stools. This process was at its peak probably in the first two decades after WW II, but certainly exists at least since the 19<sup>th</sup> century. The coppicing abandonment had been an overall process started sometime between the end of the 18<sup>th</sup> to the early 19<sup>th</sup> century. Active coppices survived only locally until the 1930s–1940s (e.g. Müllerová et al. 2014).

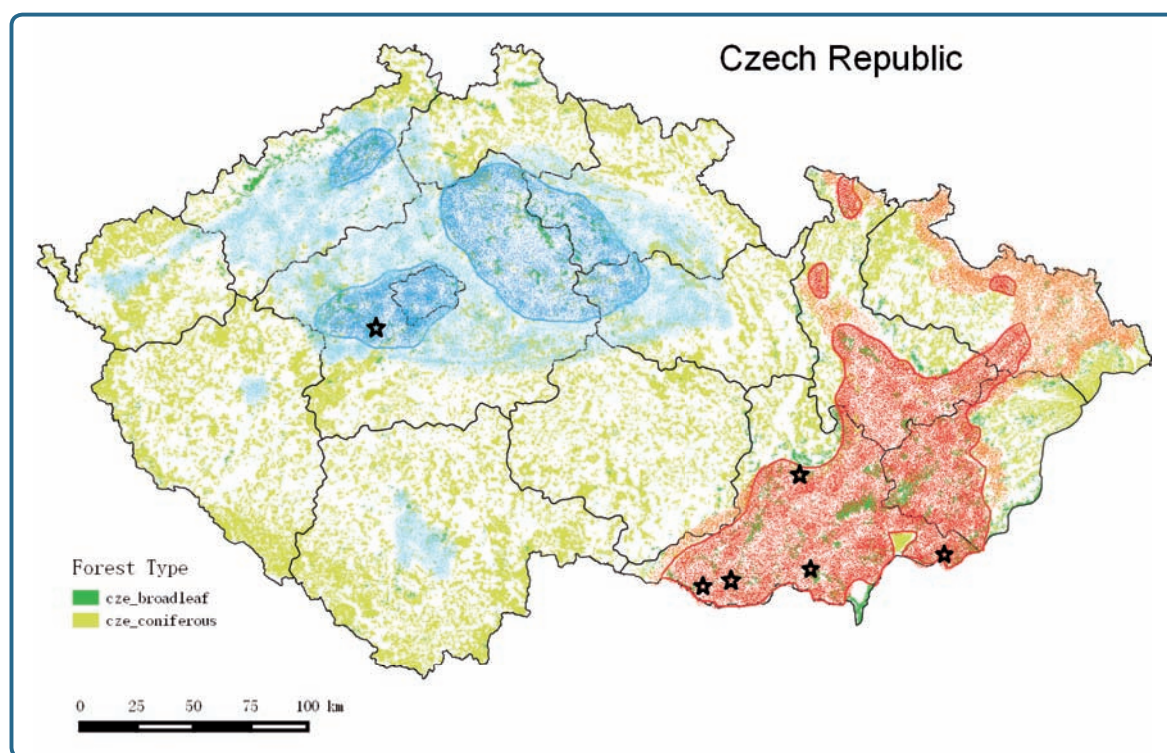



Figure 1. Extent of the historical and current coppicing in the Czech Republic. Map by R. Hédl.

-  **Solid red boundary, red filling:**  
Core area of historically prevalent coppicing for Moravia and Silesia; based on an unpublished map by Szabó et al.
-  **Solid blue boundary, blue filling:**  
Core area of historically prevalent coppicing for Bohemia; based on a map for 1947 by Maděra et al. (2017)
-  **Orange area, no solid boundary:**  
Probable additional extent of the core area of historical coppicing in Moravia and Silesia; based partly on an unpublished map by Szabó et al. and my own estimate
-  **Light-blue area, no solid boundary:**  
Estimated extent of the core historical coppicing area for Bohemia
-  **Black star:**  
Sites of restored coppices in 2017; there are 6 sites altogether, some of which have 2 to 3 sub-sites; one such site has already been abandoned (not marked)

**Background:** Broadleaved forest in dark green, coniferous forest in light green  
(Source: EFI forest map of Europe - Kempeneers et al. 2011; Päivinen et al. 2001; Schuck et al. 2002)



Coppicing can be traced back to the Middle Ages (14<sup>th</sup> century), based on the written evidence. There is, however, some dispute concerning terms and their exact meaning: “rubetum” versus “silva” (see Szabó et al. 2015). The archival data enabled modelling for the extent of coppicing in the Late Middle Ages for the whole Moravia (eastern Czech Republic; l. c.).

The area of the historical coppicing did not change much up until the 19<sup>th</sup> century. A precise reconstruction of the proportion of coppice forests at the level of cadastres (civil parishes) for the 19<sup>th</sup> century was made by Szabó et al. (unpublished map). It clearly shows an area with prevalent coppicing, however only for Moravia and small parts of historical Silesia. It is currently the best available reconstruction of the historical coppicing in the Czech Republic, because it is based directly on a large critical database of the historical archival information ([www.longwood.cz](http://www.longwood.cz)).

For the western part of the Czech Republic, Bohemia, there is no such map. A predictive modelling was made for the whole country by

Maděra et al. (2017), however the reliability of the historical source used for this prediction remains uncertain (digitalized descriptions for the so called Stable cadastre, available at <http://archivnimapy.cuzk.cz>). The same paper presents a map of the coppiced area in 1947, then already abandoned coppices. It generally conforms to the Szabó's map for the 19<sup>th</sup> century and can be used for the reconstruction of the historical coppicing in Bohemia.

To conclude, there are two “core areas” of coppicing (Fig. 1) in the Czech Republic. One in Bohemia, another in Moravia and parts of historical Silesia. They are highly correlated with lower elevations (up to 500 m a.s.l.) and high density of human inhabitation (since the Neolithic). In these areas, over 50% of all forest (often 80–90%) was regularly coppiced from at least the Middle Ages until the 19<sup>th</sup> century. Adjacent areas with less than 50% but probably no less than ca. 10% of coppicing can be estimated or predicted from the combination natural conditions, type of forest etc.

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## DESCRIPTION

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In the past, most of the forest cover in the lowlands, the warm hilly areas and highland areas of the Czech Republic were managed as coppice forests to produce firewood. In the 19<sup>th</sup> century, the decreasing demand for firewood caused coppice forests, including those with standard trees, to begin to be transformed into high forest. The transformation was done in two ways: the direct method was to re-plant using saplings produced from seed after felling coppice; the indirect one was by the singling-out of coppice stools, finally leaving only one. Around 1900, coppices in what is now the Czech Republic covered approximately 95,000 ha, representing 4.1% of forest cover (Adamec et al. 2014). Since then, the area had been decreasing.

Recently interest in the coppice forests has been increasing in the Czech Republic in order to protect endangered species, enhance biodiversity and obtain a sustainable source of energy. In the last decade, areas of coppice forest have slowly started to increase. Approximately 9,310 ha (0.36 %) of simple coppice forest and 2,393 ha (0.09 %) of coppice with standards can now be found in the Czech Republic (ÚHÚL 2014). Most of the coppice forests are situated in the south-eastern part of the Czech Republic.

According to Czech law Act no. 289/1995 on Forests, most forests cannot be felled earlier

than the age of 80. Simple coppice management is only allowed in six forest management sets of stands. Coppice forests predominantly composed of hardwood trees are preferred, with a recommended rotation length of 40 years (although this can range between 30 and 50 years, and in some cases 60 years). Where softwood trees are in the majority, the recommended rotation length is between 20 and 30 years. Recommended rotation length for willow and black locust is 40 and 70 years, respectively, in specific forest management stands. Among recommended trees for coppicing in the Czech Republic are alder, oak, hornbeam, maple, ash, elm, lime, poplar and willow; in addition wild cherry, birch and rowan can be also used.

At the present time, the efforts to restore coppice management are viewed circumspectly by some foresters; more information is required in some areas. Although the systems of coppice forest management have been covered extensively in scholarly publications, less is known about the economic effectiveness of coppice forest systems. Recently some research plots were established, converting from quasi-high forest to coppice. Promising results could contribute to positive awareness of coppice forest and this, combined with liberalisation of Czech law, could help with coppice forest renewal.

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## FORESTRY REGULATIONS

Radim Hédľ

Forests cover about 34% of the area of the Czech Republic. The long history of forest use in the Czech Lands has been paralleled by regulations applied from local to whole-country levels. Examples of popularly known historical milestones are laws imposed by the emperors Charles IV (14<sup>th</sup> century) and Maria Theresa (18<sup>th</sup> century). Countless regulations were applied historically within particular domains and properties, at least since the Middle Ages. After a long period of „traditional“ forest management, the eventually prevailing trend was towards „modern“ forestry has been in place since the end of 18<sup>th</sup> century. Originally from Germany, this rational concept aimed to produce the maximum yields of timber while securing the sustainable production of forest stands by applying strict measures protecting soil fertility and tree regeneration.

Consequently, all types of forest use interfering with timber-oriented forestry were suppressed and gradually replaced with highly standardized approach. This meant an end to the three formerly widespread non-timber forest uses, which were coppicing, wood-pasture and litter raking. Tree species composition shifted from mostly mixed and broadleaved stands to the currently prevailing plantations of Norway spruce (52%) and Scotch pine (17%), while broadleaved tree species make up only about 25% of forest composition in the Czech Republic.

The **Czech Act on Forests from 1995** declares its purpose as follows: „The purpose of this Act is to determine conditions for the preservation, tending and regeneration of forests as national riches forming an irreplaceable part of the environment, to enable the fulfillment of all their functions and to support sustainable forestry.“ An important rule is the 80-year limitation on

forest stand felling: „It is prohibited to carry out planned main felling in forests under 80 years of age...“ (Art. 33). However, the same article follows: „...in justified cases, during the course of approving the plan or preparing the guidelines or at the request of the forest owner, the relevant state forest administration body may grant exemptions from this rule.“ The exceptions from the 80-year rule are issued by the Ministry of Agriculture or Regional councils, based on the request of forest owners or on its own initiative.

The **Decree 83/1996 of the Czech Ministry of Agriculture**, provides recommendations on forest management in forest stand categories defined by dominant tree species and habitat conditions. Coppicing with a cutting period of 30 to 40 years is mentioned among recommended management types for several forest categories. Exceptions from the 80-year rule can therefore be plausibly applied in the form of coppicing. In still broader terms, **Article 8 of the Act on Forests** defines three main forest classes from the management perspective. „The class of Special Purpose Forests can be also applied to forests in relation to which a general interest in the improvement and protection of the environment or any other valid interest in the fulfillment of non-wood-producing functions of the forest is superior to the wood-producing functions.“ One category of **Special Purpose Forests** is defined as „forests necessary for the preservation of biological diversity“, cf. letter (f) of the same article.

The Law is simple, its application difficult. Exceptions allowing shorter cutting periods required for active coppicing are granted on stands of fast-growing trees, such as willows, poplars or non-native black locust. In case of slow-growing species such as oaks, exceptions

are given very reluctantly. It is largely because of historically-conditioned resistance of the great majority of forestry authorities and practicing forest managers towards short-cutting systems including coppices. The reasons should be sought in the historical development of forestry in the Czech Republic.

In the lowland areas, coppicing yielded most of the wood production in the past. Coppices („low forest“, adopted from German term *Niederwald*) and coppices-with-standards („middle forest“, from German *Mittelwald*) were very common both in hardwood and softwood stands. Coppicing was gradually abandoned during the 19<sup>th</sup> century, partly because of shift to fossil fuels, and completely ceased after the WW II. In the 1950s, during the early communist period of the then Czechoslovakia, coppicing was considered by many influential forestry researchers a „capitalist“ method, targeting at maximum wood production at the cost of depleting of soil nutrients and sustainable wood production capacity. This view basically conformed to the transformation from multiple-use towards timber-oriented forestry during the preceding century.

The second half of the 20<sup>th</sup> century witnessed a transfer of the remaining inactive coppices to high forest by the means of singling-out of the most dominant stems. This process was far from perfect, hence many today's forests still bear the original coppice structure. The area of these partially converted stands cannot be

reliably established from the forestry log books, because the record on the management form is strongly biased towards high forest. Data on the current extent of coppice forests in the Czech Republic is therefore more or less a rough estimate. However, the tireless efforts of the past two hundred years have eventually led to the complete elimination of active coppices in the country.

Current revival of coppicing in the Czech Republic follows the development in western Europe. Relaxation of timber-oriented forestry and greater acknowledgement of ecological values of forests in the past two to three decades creates opportunities for the return of traditional management forms, including coppicing. It is generally considered suitable for small- to mid-size owners, who would appreciate a regular supply of fuel wood. Another important argument for coppicing reintroduction is to provide support for biological diversity. It has been shown in many studies, both from abroad and directly from the Czech Republic, that coppicing abandonment has led to the decline of several groups of light-demanding organisms, including insects and vascular plants. Coppicing is therefore a relatively recently emerging strategy of nature conservation; it has been applied in several nature reserves. These forests are mostly protected in reserves established under the Czech law, or more recently, as a part of the EU Natura 2000 network.

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