Hungary

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Facts and Figures

Definition

Coppice forest is a forest (woodland) regenerated by vegetative shoots (stump or roots), depending on the species.

Coppice forest = Sarjerdő

Legal Framework

Stands can be regenerated by coppice – in the absence of a different decision by the forest authority, on forests with the primary function of the soil protection, shelterbelt, the river bank protection, as well as forests with low canopy closure – in the case of alder, black locust, native poplar, as well as willow.

Black locust and native poplar can be regenerated by coppice through root shoots – with the exception of 100% state-owned forests and in the absence of the different decision of the forest authority.

The conditions of the declaration of the forest regeneration for established forest must be insured in the case of regeneration by coppice within 5 years after the obligation to regenerate the forest was formed.

Sources:

Act No. XXXVII of 2009 on forests; the protection and management of forests
Regulation 61/2017 on forests; the protection and management of forests

Description

Hungary is situated in the middle of Europe, at the central and western parts of the Carpathian Basin. Due to the characteristics of the Basin, the majority of the area of the country is flat; only one third exceeds 200 m elevation, with merely 2 % above 400 m sea-level. The extensive lower parts are characterized by small amounts of precipitation and extreme temperature changes. The naturally forest-covered areas are the western part of the Trans-Danubian region and the mountains – generally higher than 400m above sea level. Here the annual precipitation generally exceeds the 600 mm required for the maintenance of forests. In the lower regions, forests can only develop where the water level is not too high, but within reach of the tree roots, or on flood plains.

In 1920, on account of the Treaty of Trianon, the forested area fell from 7.4 million hectares to 1.2 million hectares. This radical reduction was accompanied by the fact that predominantly low productivity areas remained within the new borders. They provided fuelwood for local inhabitants – most of these forests were coppice forests.

After the Second World War, natural regeneration by coppicing was mostly from stumps with coppice shoots (alder, willow), and to a lesser degree with root suckers (black locust, native poplar).

The new forest act – Act 2009 XXXVII on the protection and management of forests – enables coppicing of alder, native poplar, willow (stumps coppice) and black locust (root suckers).

As black locust is one of the most important species in Hungary, we will briefly summarize the most important knowledge about its regeneration by coppicing.

Black locust was introduced in Hungary between 1710 and 1720. The first large black locust forests were established at the beginning of the 19th century on the Great Hungarian Plain, stabilizing the wind-blown, sandy soil. Black locust occupied 37,000 ha in 1885, 109,000 ha in 1911, 186,000 ha in 1938 and 4,000,000 ha in 2005. At present, it is the most widely planted species in Hungary, covering 24% of the country's total forest area. One-third of these stands are high forests and two-thirds are of coppice origin. In the 1960s, Hungary had more black locust forests than the rest of Europe put together. Black locust afforestation and artificial regeneration may utilize seedlings. The average per hectare volume in all black locust forests is 125 m^3 ha^{-1}, the average volume at harvest is 190 m^3 ha^{-1} and the average harvest age is 31 years. Black locust forests in Hungary have been established on a range of sites; however, only sites with an adequate moisture supply, well-aerated and loose-structured soil that is rich in nutrients and humus can produce good quality timber. Black locust stands are often regenerated by coppice (from root suckers). In young stands of coppice origin, a cleaning operation should be carried out to adjust spacing when the stands are 3-6 years old and should reduce stocking to less than 5000 stems ha^{-1}.

Figure 1. Hornbeam (*Carpinus betulus*) middle aged forest of coppice origin

Black locust are not only regenerated naturally from root suckers, but also artificially, i.e., with seedlings. The latter is also used for the establishment of new black locust plantations (stands). There are some favorable plant characteristics of black locust which make both regeneration methods possible. For seedlings, growing seeds are produced in a wide range of conditions, germinate rapidly, and preserve their germination capacity for a long time. Black locust cannot be regenerated easily by seed in a natural way due to its very hard seed-coat. On the other hand, the root system is very plastic, its vegetative growth from fragments is intensive and it is difficult to uproot (Führer and Rédei, 2003).

Table 1. Comprehensive facts on forests in Hungary

Registered forest management area	1,000 ha	2,060.8
Area of forest sub-compartments	1,000 ha	1,940.7
Forest share based on forest management area	%	22.2
Growing stock	million m^3	378.5
Gross annual increment	million m^3 yr^{-1}	13.0
Total felling	million m^3	7.4
Final cuts	million m^3	5.0
Regeneration per year	1,000 ha	17.0
Afforestation per year	1,000 ha	0.3

Table 2. Coppice in Hungary by ownership (in ha)

State ownership	root coppice	102,775.63
	stump coppice	184,988.49
Public ownership	root coppice	3,056.65
	stump coppice	2,917.50
Private ownership	root coppice	165,609.18
	stump coppice	112,835.70
Mixed ownership	root coppice	5,229.82
	stump coppice	4,006.69

When attempting semi-natural or man-made afforestation, or reforestation with black locust, the following basic technologies and operation groups are applied:

- Black locust afforestation *with deep loosening*: soil preparation (without trenching) by deep loosening of soil, planting by planting-machine or a tractor-drawn pit-drilling machine, manual soil cultivation in the rows, in inter-rows by machine.
- Black locust afforestation *with trenching or deep ploughing*: planting by planting machine or a tractor-drawn pit-drilling machine, manual soil cultivation in the rows, in the inter-rows by machine.
- *Semi-natural reforestation by root-suckers*: slash removal from the cut-area, bush-cutting, root-ripping, knocking down of coppice shoots, singling of clumps of shoots.
- *Man-made reforestation* of black locust stand *by deep loosening*: slash removal, bush cutting, chemical treatment against sprouting, deep loosening, planting by machine or tractor drawn pit-borer, knocking down of coppice shoots, manual soil cultivation in the row and mechanized in the inter-row.
- *Man-made reforestation* of black locust stands *by complete soil preparation*: slash removal, bush cutting, stump removal (stump-lifting, removal and terrain leveling), trenching, planting by machine or tractor-mounted pit-borer, manual soil cultivation in the rows and mechanized in the inter-row.

The best time for planting is in the spring. The most popular spacing for planting is 2.4 m between rows and 0.8-1.0 m within rows (4,000-5,000 seedlings ha^{-1}). Age of planting stock: 1 year, of seedbed quality. Planting may be by machine into a slit, in a pit manually prepared, or by tractor-mounted borer. Coppicing by root ripping provides abundant root suckers due to the root wounds. This operation is made with a winged deep-loosening machine working at a depth of 35-40 cm.

Criteria for successful afforestation: at least 3,500 viable plants ha^{-1} when planting with seedlings; in young coppiced stands at least 5,000 suckers ha^{-1}, which must be at least 3 m in height and consist of non-forked healthy trees, regularly distributed (Führer and Rédei, 2003).

Figure 2. Black locust (*Robinia pseudoacacia*) mixed stand (coppice and high forest)

References

Führer, E., Rédei, K., 2003. *Site Requirements and Stand Establishment Techniques for Black Locust (Robinia pseudoacacia L.) Stands in Hungary* (http://www.fao.org/docrep/ARTICLE/WFC/XII/0320-B2.htm).

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