

FOREST MANAGEMENT OF SESSILE AND PEDUNCULATE OAK IN GERMANY—FROM COPPICE FORESTS TO CLIMATE-SMART FORESTS FOR DIVERSE ECOSYSTEM SERVICES

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PURPOSE AND SCOPE

This contribution is divided into two parts. First, a brief overview of the development of oak management in Germany is given. Second, the empirical results of different thinning strategies in a young sessile oak stand are presented.

The German native oak species sessile oak (*Quercus petraea*) and pedunculate oak (*Quercus robur*) developed from a preferred species in coppice systems for the livelihoods of the people in past centuries to a widely appreciated high-value timber species in suitable German regions such as the Spessart mountains (Schröder 2016). The production of high-value timber is conducted in a two-stage approach mostly in even-aged pure stands established after artificial regeneration (Spiecker 1995). Decisive in the regeneration phase is light management, i.e., the size and shape of canopy openings to give oak a competitive advantage in growth over the late successional European beech. In the face of a recent decline of oak and the challenges of climate change, the management of oak is revised, so that mixed stands in irregular stand structures are preferably pursued (continuous cover forestry) to provide diverse ecosystem services. Moreover, oak plays a central role in rehabilitating the large, damaged forest areas formerly covered by conifer species after the subsequent hot droughts from 2018 to 2020. Here, innovative approaches, such as cluster planting, come into play.

METHODS AND APPROACH

The aim of the empirical study (see Bontrup 2023) was to compare early intensive thinnings to traditional low-input strategies. Therefore, larger and more vital crowns of future crop trees were developed, allowing for an earlier harvest and the promotion of a larger share of desired admixed tree species.

In a stand that is now 29 years old, 4 trial plots with 50 future crop trees of sessile oak were established. These have been treated in three different variants

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since 2014: a) in accordance with the silvicultural guidelines of the federal state of Brandenburg with only a few removals of competing trees, b) with a strong selection thinning, and c) with a moderate high thinning, in which severe competitors of the future crop trees and other poorly shaped trees in the stand were removed. The fourth plot has not been treated and served as a reference plot.

In the plots, the following individual tree and stand parameters were measured: tree number, tree species, diameter at breast height (d.b.h.), tree vitality, stem straightness, number of water sprouts per future crop tree, basal area, and standing volume of the stand.

FINDINGS AND IMPLICATIONS

The evaluation of the results shows that there are hardly any significant differences in the overall stand. What is positive is the growth performance of the plot, which underwent a strong selection thinning. The diversity of tree species, which also naturally established and rejuvenated, improved especially in this plot. As far as quality and vitality are concerned, selection thinning hardly seems to have any disadvantages; nevertheless, the results were slightly lower than those of the plots with higher density.

Thus, early thinning is a suited measure to enhance growth performance and vitality of oak trees, with expected advantages for tree resilience under a changing climate.

LITERATURE CITED

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