



DETERMINING THE OPTIMAL SOWING DATES FOR OAK SPECIES SEEDS IN FOREST NURSERIES

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Abstract

The trees of the genus *Quercus* are known for their high-quality wood, ornamental value, and adaptability to unfavorable climatic factors. In Uzbekistan, representatives of the *Quercus* genus were absent about two centuries ago. However, at present, the common oak is becoming one of the most widely cultivated species in the major cities of the country. As a result, interest in other species of oak is also growing. Currently, experiments are being conducted on the introduction of different oak species and the cultivation of their saplings.

Keywords: Oak, species, natural, cultural, wood, ornamental, forest, technology, intensive, tree, sapling, standard.

Introduction

Oak species are considered valuable trees that are cultivated naturally and artificially in many countries, providing precious timber and being ornamental. The naturally preserved oak forests worldwide cover an area of 3.7 million hectares in Russia, 2.7 million hectares in France, 1.7 million hectares in Ukraine, 0.9 million hectares in Germany, 0.5 million hectares in Denmark, and 0.3 million hectares in Croatia [4]. The cultivation of oak species, establishment of forests, landscaping, utilization of wood, and the development of technologies for



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growing saplings are pressing issues. In Uzbekistan, oak species are not naturally distributed. These species were first introduced and planted at the end of the 19th century. Currently, the common oak is successfully grown in large cities of Uzbekistan. Therefore, the acclimatization of other oak species to the conditions of Uzbekistan is considered promising [2; 3]. Though few in number, experiments have been conducted on the cultivation of the following oak species in Uzbekistan: common oak (*Quercus robur* L.), the columnar form of common oak (*Quercus robur* L. var. *Fastigiata*), chestnut-leaved oak (*Quercus castaneifolia* L.), and Austrian oak (*Quercus cerris* L.).

Research Methodology

Experiments on the development of intensive methods for the cultivation of oak saplings were carried out based on the methodology proposed by S.M. Ablayev, Y.Kh. Yuldashev, and B.I. Eshankulov (2009) [1].

Research Results

As with all tree and shrub species, determining the optimal sowing dates for oak species' seeds is crucial. It is known that, depending on the species of forest trees and shrubs, seeds can be sown in all four seasons of the year; however, the main sowing period falls in the autumn and spring months. In the Jizzakh region, as in other regions of Uzbekistan, the fruit of the common oak and its columnar form begin to ripen in August. This provides the opportunity to sow the seeds and grow saplings in August-September. As a result, the saplings may experience faster growth in the following spring. In the conditions of Tashkent district of Tashkent region, since the seeds of chestnut-leaved and Austrian oaks ripen in October, there is no possibility of conducting this experiment with these species (Table 1). To study the results of sowing oak seeds at different times, experiments were conducted in the forest nursery of the Zomin State Forest Enterprise of Jizzakh region.



Table 1 Effect of Sowing Dates on Germination of Oak Species Seeds (2021-2023)

No	Species Name	Sowing Date			Germination Rate (%)		
		August	November	March	August	November	March
1	Quercus robur L.	+	+	+	54	70	60
2	Quercus robur L. var. Fastigiata	+	+	+	62	77	68
3	Quercus castaneifolia L.	-	+	+	-	74	66
4	Quercus cerris L.	-	+	+	-	72	62

As seen in Table 1, when early sowing was carried out for the common oak and its columnar form, i.e., when the seeds were sown in the last decade of August, the germination rate was 54% for the common oak and 62% for the columnar form of common oak. When sowing was done in the first ten days of November, the germination rate increased to 70% for the common oak and 77% for the columnar form. In the experiments conducted in the first ten days of March, the germination rate was 60% for the common oak and 68% for the columnar form. The seeds of the oak species under study mature at different times. Chestnut-leaved and Austrian oak seeds begin to ripen in October; therefore, due to their late ripening, experiments were only conducted in November and March for sowing dates. In this case, the germination rates for seeds sown in the first ten days of November were 74% for the chestnut-leaved oak and 72% for the Austrian oak, while for seeds sown in the first ten days of March, the rates were 66% for the chestnut-leaved oak and 62% for the Austrian oak.

Based on the results of the experiments, the highest germination rates for all four species were observed in the experiments conducted in November. To study the survival rate of the saplings, the survival rates of the oak species saplings sown at different times were also analyzed. The sowing was carried out in three different periods: early (end of August, first ten days of September), late autumn (last days of October and first ten days of November), and spring (first ten days of March) (Table 2).



Table 2 Growth of Oak Species Saplings Sown at Different Times (2021-2022)

	Oak Species	Indicators by Sowing Date														
		Survival Rate (at the end of 2 growing seasons), %			Height, cm						Root Collar Diameter, cm					
		August	November	March	Third Decade of August		First Decade of November		Second Decade of March		Third Decade of August		First Decade of November		Second Decade of March	
					cm	P%	cm	P%	cm	P%	cm	P%	cm	P%	cm	P%
1	Quercus robur L.	40	60	48	51,0±1,27	2,5	30,0±1,05	3,5	28,0±0,87	3,1	1,0±0,03	3,2	0,4±0,09	2,3	0,4±0,01	3,8
2	Quercus robur L. var. Fastigiata	48	68	57	54,0±1,67	3,1	25,0±0,62	2,5	24,0±0,67	2,8	1,1±0,04	3,9	0,4±0,01	3,5	0,4±0,01	3,2
3	castaneifolia L.	-	70	60	-	-	25,0±0,95	3,8	24,0±0,82	3,4	-	-	0,4±0,02	4,2	0,3±0,01	4,3
4	Quercus cerris L.	-	61	53	-	-	37,0±1,18	3,2	33,0±1,18	3,2	-	-	0,3±0,01	3,8	0,3±0,01	3,5

Based on the data from Table 2, in terms of the second-year growth indicators of the oak species saplings sown at different times, the highest survival rate at the end of the growing season was observed for the late autumn sowing period across all oak species. In terms of height, the best results were seen when the seeds were sown in the early period (August, September). All of the tallest saplings showed an increase in root collar diameter. For saplings that germinated from seeds sown at the end of August and the beginning of September, the height was 51 cm for common oak, with a root collar diameter of 1.0 cm, and 54 cm for the columnar form of common oak, with a root collar diameter of 1.1 cm, meeting the standard requirements. In the chestnut-leaved oak and Austrian oak, the height of saplings from seeds sown in November and August was relatively lower. The survival rate was higher for the late autumn sowing, with the highest survival recorded for the November sowing. The survival rates were 60% for the common oak, 68% for the columnar form of common oak, 70% for the chestnut-leaved oak, and 61% for the Austrian oak.



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Conclusion

According to the conducted experiments, it was determined that late autumn sowing is the most favorable sowing period for all species. Therefore, based on the conditions of the Zomin district in the Jizzakh region, it is recommended to sow the seeds of all the oak species mentioned above in the late autumn.

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