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SPRUCE STANDS DIAMETER STRUCTURE OF ARTIFICIAL ORIGIN

This paper analyzes the structure of spruce stands of artificial origin according to natural diameter class. There have been found that the coefficient of variation and skewness of trees line distribution according to natural diameter class of spruce stands of artificial origin decreases maturing. It is revealed that a line of distribution according to natural diameter class in mature spruce artificial origin is more compact than in the spruce forests of natural origin. There have been found that the 5th grade spruce crops in three central natural levels are thicker than stands of natural origin by 11.6%.

Introduction. Basic laws of forest stands structure and growth allow us to determine ways to improve productivity and quality of forests. Also, the forest stands structure is theoretical basis of woodcutting are and forest fund calculation using normative references that is needed for more accurate planning and carrying out forestry activities identifying their economic efficiency. Mathematical expression pattern of stands structure according to principles of taxation indicators allows us to trace qualitative and quantitative statics and dynamics of forest stands and manage their growth and development with the help of certain business activities.

As a result of ever-increasing areas of artificial plantations of the republic, investigating the features of formation and structure of these stands is not only a general educational interest, but also has a certain practical significance.

One of the most important indicators of the build-stand is the structure of trees diameter. Therefore, almost all researchers whose work is related to investigation of structure and growth of forest stands paid much attention to the structure of forest stands concerning trees diameter.

In the process of growth and development of plants there is observed differentiation of trees concerning diameter affecting productivity and commodity composition of forest stands.

The main objectives of this work are to establish the laws of structure of spruce stands of artificial origin in diameter.

Main part. Among the spruce crops of Belarus the most common are wood sorrel spruce (45.0%) and brake spruce (18.3%). This feature served as the criterion for selecting the objects of study.

The study of structure mechanism of spruce stands of artificial origin in diameter was being performed on the basis of enumerative taxation of stands at 63 temporary plots embodied in even-aged, pure composition stands of artificial origin of sorrel and brake forest types. Collection of experimental material was executed in forest fund of 13 state forestry institutions: Slutsk Tolochin, Mogilev, Logojsk, Vitebsk, Uzda, Volkovissk, Minsk, Postavy, Smolevichi forestries and Orsha, Smorgon, Glubokoe experimental forestries.

Investigating trees distribution according to diameter there have been used the method of natural stages developed by Tyurin. Distribution of trees by diameter classes is a natural generalization of a variation line characterizing variability of forest stands thickness and level of representation of individual diameter classes comprising a certain proportion of average diameter of forest stand [1]. Statistical analysis of structure of spruce stands of artificial origin is made according to the enumeration of trees at temporary plots. The basic statistics of natural distribution according to diameter classes in spruce stands of artificial origin have been determined by age class (see table).
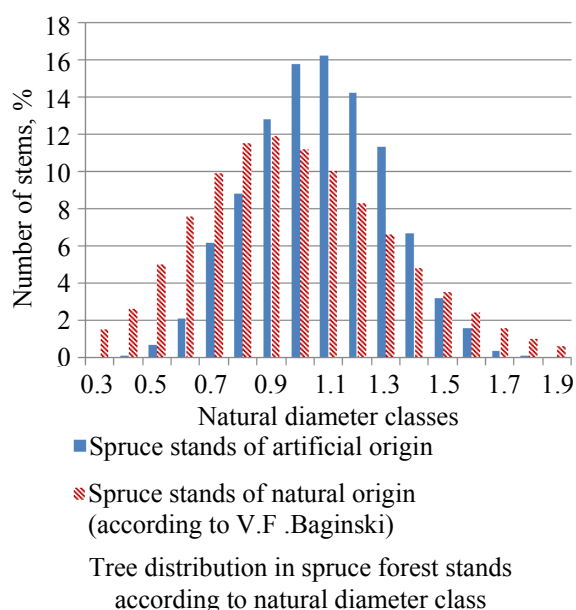
Along with the coefficient of variation the important parameters in the distribution of stems number in forest stands concerning diameter are indicators of asymmetry and excess. Factor of rows asymmetry of tree distribution according to in natural of diameter class varies, and with raising of age it tends to zero.

Statistical indicators of spruce species distribution according to natural diameter class

Age class	Average value	Dispersion	Coefficient of variation, %	Standard error	Standard deviation	Asymmetry	Asymmetry standard error	Excess	Excess standard error
2nd	1.038	0.119	33.2	0.345	0.00053	0.411	0.004	−0.319	0.008
3d	1.054	0.086	27.8	0.293	0.00034	0.166	0.003	−0.330	0.006
4th	1.061	0.078	26.4	0.280	0.00041	0.155	0.004	−0.227	0.007
5th	1.073	0.055	21.9	0.234	0.00061	0.047	0.006	−0.319	0.013

Correlation between the coefficient of excess and age is not expressed quite clearly. This is probably due to economic activity conducted in spruce stands of artificial origin.

In order to establish the structural features of spruce stands of artificial origin, there have been carried out comparative analysis between their distribution row according to natural diameter class and distribution row of spruce standsof natural origin in mature age. The result revealed (Figure) that distribution row according to natural diameter class mature spruce forests of artificial origin in the case of Belarus, is more compact (reducing numbers from 0.4-0.5 to 1.7-1.8) than for standards to spruce forests of natural origin (from 0.3 to 1.9 according to V.F. Baginski) [2].

Tree distribution in spruce forest stands according to natural diameter class

In the study of the taxation structure of forest stands analysis trunk diameter variation is of the greatest interest . According to investigations results coefficient of variation decreases with age to 21.9%.

It is determined that in spruce crops of the 5th age class in three central natural diameter classes there have been concentrated 46.2% of tree trunks of forest stand, which is by 11.6% higher than stands of natural origin (according to V.F. Baginski). Due to the lower differentiation of trees at maturity in final felling there will be more uniform output of assortments than in spruce stands of artificial origin.

Conclusion. The paper analyzed the structure of spruce forests tree diameter of artificial origin. It was found that the coefficients of variation and asymmetry rows of trees according to natural distribution of diameter classes of spruce stands decrease with age. There have been determined that distribution line according to natural diameter class in mature spruce stands of artificial origin in the case of Belarus, is more compact (reducing numbers from 0.4–0.5 to 1.7–1.8) than for standards to spruce forests of natural origin (from 0.3 to 1.9). It is determined that in spruce crops of the 5th age class in three central natural diameter classes there have been concentrated 46.2% of tree trunks of forest stand, which is by 11.6% higher than stands of natural origin.

References

1. Тюрин А. В. Таксация леса. 2-е изд. М.: Гослестехиздат, 1945. 375 с.

2. Багинский В. Ф. Нормативные материалы для таксации лесов Белорусской ССР. М.: ЦБНТИ – лесхоз, 1984. 308 с.