

Original article

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Process Patterns of Self-Organization of the Dimensional Structure of Scots Pine Forest Stands

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Abstract. The article explores the patterns of the self-organization process of the dimensional structure of tree stands in the cenopopulations of Scots pine and provides its description appropriate mathematical equations mapping the changes in the dimensional characteristics of the forest stand and the radial annual tree growth. The study proved that the process of self-organization of the dimensional structure of forest stands depends more on the internal properties than on variations in climate and external influences. In each coenopopulation the process proceeds nonlinearly, and differently, and inevitably leads to a decrease in the initial genetic diversity. In the process trees differentiate into a number of discrete groups, hereditarily differing in their ecological demands for environmental conditions, one of which gains an advantage in the development of its resources over another, which is no longer able to restore parity after an extended period of suppression. Thus, the authors suggest to evaluate the process of self-organization of the dimensional structure of forest stands based on the change in the value of the standard deviation of the cenopopulation tree diameter, as well as the asymmetry coefficients, and the excess of the distribution series of the taxation parameter. Furthermore, the authors recommend to use the analysis of dendrochronological series of different tree groups to identify the patterns of the process in coenopopulations. Hence, a network of stationary test plots is regarded a reliable foundation to derive new knowledge on the patterns of its course.

Key words: Scots pine, cenopopulations, dimensional structure, trunk diameter, self-organization, radial growth, dynamics.

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