

Long-Term Dynamics Parcellary Structure of Forest Phytocenoses in Clearings of Birch Forests With the Preservation of the Second Layer of Spruce in the Southern Taiga

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The article presents the results of studying the dynamics of the parcel structure of forest phytocenoses after cutting of birch (*Betula pendula* Roth.) with preservation of the second tier of spruce (*Picea abies* L.). Studies conducted in the southern taiga, Northern forest experimental station of Institute of forest science Russian Academy of Sciences (Yaroslavl region, Rybinsk district) on three permanent sample plots in the prevailing forest types – *P. myrtillosum*, *P. oxalidosum* and *P. oxalidosum-sphagnosum*, the most widely represented in the southern taiga [1]. Trial areas were laid on cutting down of 75-year-old birch trees 18 years after felling, repeated observations were made 10 and 20 years later. Felling of the forest was aimed at the preservation of the second layer of spruce, the majority of small timber died in the first years after the removal of the birch canopy as a result of damage caused by falling trees left. The article sets out the methodology for the allocation of parcels by the structural features of all tiers of phytocoenosis – tree, shrub, herb-shrub. A review of literature and methodological approaches to the study of the parcel structure of birch and spruce phytocenoses published earlier in [2].

It is established that the felling of birch forests with the preservation of the second tier spruce are distinguished by a large parcellary diversity and presents a dispersed plots ranging from 20 to 450 m², with distinction in all tiers of the phytocenosis. Placement and area of parcels on felling are caused by the parcel structure of phytocenosis to the felling of the forest stand, the ratio and placement of technological elements on the felling, the age of the felling. The number of parcels of parcels on 18-year-old felling reaches 68–110 pcs. ha⁻¹, during the next 20 years slightly decreasing to 63–69 pcs. ha⁻¹. On the control before cutting the birch canopy is only 11 to 15 pcs. ha⁻¹ [3].

On apiaries 18-year-old cuttings 62% of their area is a parcel with spruce pre-renewal under a pole stand (height of spruce from 4 to 13 meters with a canopy density of 57–100%). Over the next 10 years, part of such parcels (42%) are transformed into parcels, where the spruce enters the stage of maturation, in which the dominant is the tier with the height of the spruce more than 13.1 m with the canopy closed 51–100%. After 38 years after the felling of birch such parcel is already 79–91% of the apiaries. Subsequent renewal of the spruce does not form sep-

arate parcels. On 8–16% of the area of apiaries formed parcels with young *Populus tremula* L. and *Betula pendula* Roth. After 20 years, their area is reduced slightly (to 6–15%).

From 38-year period after the felling of birch, the area of the skidding trails is gradually decreasing (from 15% to 5%). Fragmentation of the parcel structure is preserved (up to 22 pcs. ha⁻¹) without the formation of parcels with the renewal of tree species. Only 7–34% of the area of the skidding trails was formed parcel with young *Populus tremula* and *Betula pendula*. On apiaries 18-year-old cuttings 62% of their area is a parcel with preliminary spruce under a pole stand (height of spruce from 4 to 13 meters with a canopy density of 57–100%). Over the next 10 years, part of such parcels (42%) are transformed into parcels, where the spruce enters the stage of maturation, in which the dominant is the tier with the height of the spruce more than 13.1 m with the canopy closed 51–100%. After 38 years after the felling of birch such parcel is already 79–91% of the apiaries. Subsequent renewal of the spruce does not form separate parcels. On 8-16% of the area of apiaries formed parcels with young *Populus tremula* and *Betula pendula*. After 20 years, their area is reduced slightly (to 6–15%).

From 38-year period after the felling of birch, the area of the skidding trails is gradually decreasing (from 15% to 5%). Fragmentation of the parcel structure is preserved (up to 22 pcs.ha⁻¹) without the formation of parcels with the renewal of tree species. Only 7–34% of the area of the skidding trails was formed parcel with young *Populus tremula* and *Betula pendula* in the upper layer of phytocenosis.

The author concludes that the study of the structure of forest phytocenoses at the parcel level will allow to make a forecast of their further development, to assess the possibility of successful renewal of tree species and the quality of the undergrowth. On the basis of the analysis of the forest phytocenosis parcel structure it is possible to estimate with sufficient accuracy the structural organization of the territory after cutting the upper canopy of the forest stand, to predict the optimal forestry measures aimed at accelerating the formation of high-performance coniferous stands.

References

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