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L. N. Rozhkov, I. F. Yeroshkina
Belarusian State Technological University

REPRODUCTION OF NATIVE FOREST SPECIES IN THE PROCESS OF NON-CONTINUOUS FELLING

In the article the questions of optimization of species composition of forests of the Republic of Belarus through the rehabilitation of native forest species. The objects of recovery are softwood trees (birch, aspen, grey alder), which occupy $\approx 30\%$ of the total area of forest land. The problem of formation of optimal species structure of forests is still far from its solution.

Data analysis 2 the state production forestry associations showed that over the last two decades, area under 20 years to those young stands, is a minimum from 20.4 to 51.7% of the area of forested land in this age group.

Optimization of species composition of forests is on a recovery path of the cutting area of the main use and renovation of plantations.

The article presents the experience of the recovery of indigenous tree stands on the place of derivatives by carrying out selective felling and continuous deforestation clearcutting with preservation of undergrowth and measures to promote natural regeneration.

Key words: indigenous breed forest, secondary forests, age structure, selective cutting of main use.

Introduction. Strategic Development Plan of the forestry sector for the period from 2015 to 2030 is given the task to optimize the species structure of forests of the Republic of Belarus in the context of the prevailing species. In particular, it was given the task to increase to 60% the share of the pine forest formations in the lands covered by forests by 2030 (2015–50.3%) and to reduce the share of birch to 13% (2015–23.2%) [1, p. 19].

Main part. In forestry of the Republic is payed great attention to optimizing the species structure of

forests. Forest Fund of the Republic is subjected to the soil survey with the release of soil-typological groups (STG). Target species are substantiated for each STG, it is taken into account in forest management projects in the planning of reforestation and rehabilitation of forests.

The a whole on republic the area of derivatives broadleaved forests (birch, aspen, gray alder) in our estimation is at least 1,098 thousand ha, or 28.9% of the total area of forest land (Table 1) [2, p. 47].

Table 1

Forest land of Ministry of Forestry of the Republic of Belarus, occupied derivatives formations

Forest types	Square, ha			In total
	wooded land	not wooded land	non-closed forest plantations, nurseries and plantations	
Birch forest of heathy	7,321	15	62	7,398
Birchand aspen forest of cowberry	1,215	4	5	1,224
Birchand aspen forest of mossy	52,277	287	1,797	54,361
Birchand aspen forest of fern	203,588	1,973	767	206,328
Birchand aspen forest of oxalis	348,879	7,210	216	356,305
Birchand aspen forest of blueberry	349,364	3,393	828	353,585
Birchand aspen forest of goutweed	83,389	2,177	49	85,615
Birchand aspen forest of nettle	30,143	2,977	118	33,238
In all	1,076,176	18,036	3,842	1,098,054

Table 2

Area derivatives plants among 20-year-old saplings

A series of forest types	Busy derivatives forest stands, ha		
	birch	aspen	in total
<i>Brest State Production Forestry Association</i>			
Heathery	162.8	–	162.8
Cowberry	46.4	–	46.4
Mossy	1,149.6	41.6	1,191.2

End of Table 2

A series of forest types	Busy derivatives forest stands, ha		
	birch	aspen	in total
Fern	1,560.2	175.4	1,735.6
Oxalis	1,142.8	219.3	1,362.1
Bilberry	7,525.4	414.4	7,939.8
Goutweed	105.7	26.3	132.0
Nettle	693.9	100.1	794.0
<i>In total</i>	12,386.8	977.1	13,363.9
<i>Mogilev State Production Forestry Association</i>			
Heathery	341.2	–	341.2
Cowberry	31.6	76.6	108.2
Mossy	2,327.1	83.0	2,410.1
Fern	7,366.5	574.0	7,940.5
Oxalis	9,712.4	3,917.3	13,629.7
Bilberry	8,426.3	655.8	9,082.1
Goutweed	946.8	862.7	1,809.5
Nettle	387.1	215.9	603.0
<i>In total</i>	29,539.0	6,385.3	35,924.3

In fact, this lands of forest fund and are the objects of the restoration of indigenous forest-forming species.

Nevertheless, the problem of the optimal structure of forest species is far from being resolved (Table 2). The data show that among the recovered over the last two decades, plantations are derived at least in Brest State Production Forestry Association 20.4% and Mogilev State Production Forestry Association 51.7% of the forested land in these age groups Forest.

Conventionally, for the purpose of reforestation, forest fund for softwood trees is recommended to be divided into 3 groups: upland cutting area with the presence of the target species of undergrowth; such as the cutting area with undergrowth of non-target species or no undergrowth; cutting areas with excessive moisture or planned for the resumption of softwood stands. The objects of the reproduction of indigenous forest-forming species by non-continuous felling forest logging site will be marked above the first group of softwood plantations. In the short term (2015–2030), we identified deciduous plantings, constitute projected forest fund, are presented in Table 3.

Deciduous stands fullness more than 0.8 with equity participation in the composition of the target species to 4 units are suitable for long-gradual felling. Possible area for their planning for the next 15 years will be from 160 to 240 hectares per year (depending on the variant of the AAC).

Softwood stands, the fullness of which is 0.5–0.6, with a target adolescents bedrock suitable for gradual cuttings or clear-preserving undergrowth and measures to promote natural regeneration. Possible area for their planning will be from 3.4 to 5.1 thousand hectares annually.

Table 3

**Projected 2016–2030 non-continuous felling fund
in softwood plantations, the percentage
of the area of forest fund**

State Production Forestry Association	Birch, aspen and gray alder fullness ≥0.8 of up to 4 units spruce, pine	Birch, aspen, gray alder oxalis, goutweed, blueberry, fern undergrowth with the target species	In total
Brest	0.8	4.8	5.6
Vitebsk	0.5	9.0	9.5
Grodno	0.01	4.5	4.5
Gomel	0.3	2.6	2.9
Mogilev	–	8.8	8.8
Minsk	0.3	7.6	7.9
<i>In total</i>	0.3	6.4	6.7

The experience of such methods of cutting is on the Department of Forestry BSTU.

Long-gradual felling was founded in 1999 by Professor Rozhkov, Karankevich forester and a senior research fellow Khodorovich in the Oshmyany forestry.

In this area in 1997 and 2005, two doses of the first cycle is long, gradual felling were conducted. During the first dose had been cut 31% of aspen and 10% birch. During the second reception has been removed in the first tier of the remaining tree stand.

The first reception of the second cycle is long, gradual cutting scheduled to begin in 2030, when a spruce tree stand, which was released in the first tier as a result of the first cycle, reaches the age of maturity. The second method of the second cycle – after 30 years in 2060. Dynamics of wood produc-

tivity as a result of long-term methods of gradual cutting-selected by weight is as follows: 1997 – 92 m³/ha, in 2005 – 121, 2030 – 246, 2060 – 547 and 2080 – 62 m³/ha; total for the rotation period – 1068 m³/ha, which is 15% higher than for option clear-felling without undergrowth preservation, followed by the establishment of forest plantations [3]. Birch replaced by indigenous forest-forming step the main cabin can also be achieved through clear-felling. Implementation of one of the variants of this problem is described below.

The complex planting is a object of the experiment: a mixed composition (birch, aspen, black alder, spruce), different ages (age growing stock represented by generations of 100–110 years, 70–75 years, 35–50 years, young growth from 2 to 25 years) [4]. Planting is related to the economic section birch effect achieving softwood trees ripe age, although in previous periods of forest management, it could equally be attributed to the spruce and economic section. Deciduous tree stand was characterized by an element of class II biological sustainability and needed sanitary and recreational activities. For this reason, the need arose in the primary purpose cutting virtually all broadleaved species of trees and some specimens of spruce.

Clear-felling with preservation of undergrowth and small tree felling spruce view chosen. If the sanitary condition of softwood trees stand was the best and did not require the imposition of urgent sanitary measures, more appropriate to view logging could be assigned to a long-gradual cutting of the main use of two methods of cutting down mature trees in the first cutting cycle.

Preservation of the releasing on the rearing of the stand and the undergrowth is provided directional felling of trees in the direction of the apex angle portage $\approx 40\text{--}50^\circ$. Logging residues are ground, partially used to strengthen the skid trails,

and the rest are placed on apiaries in piles and left to rot. After logging activities carried mandrel preserved undergrowth, his release from forest residues, where necessary.

Completed final felling complies with the criteria for sustainable forest management. Ensure the preservation of environment protection functions of the forest area on the stage of clear-felling and renewal: the completeness of the stored component of the stand is 0.23 units, 0.36 fullness of undergrowth, which together provide a minimum abatement completeness of the forest community – 0.6. Provided naturally restoring indigenous (spruce) stand in place of derivative birch and alder stand. Reduce the rotation period.

The next intake main cabin of the pilot is supposed to stand in 2045. Projected to 2045 plantings following characteristics: 4S (105) 1S (75) 5S (50), the fullness of – 0.75, the stock – 260 m³/ha.

This tree stand is the most appropriate for selective forms of economy with the use of voluntary-selective felling. Voluntary-selective logging are considered the standard of felling and have advantages in forestry and ecological and economic terms compared to other methods of cutting.

Conclusion. Optimization of the structure-specific tours of forest plantations is solved by the reconstruction and recovery of cutting areas felling forest. The main focus in the reduction of felling areas felling should be paid to the method of logging and restoration of indigenous forest-forming species in softwood stands: birch, aspen and gray alder.

Softwood stands with the fullness of more than 0.8 with equity participation in the composition of the target species to 4 units are suitable for long-gradual felling. Softwood stands fullness 0.5–0.6 with a target adolescents bedrock suitable for gradual cuttings or clear-preserving undergrowth and measures to promote natural regeneration.

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Information about the authors

Rozhkov Leonid Nikolaevich – DSc (Agriculture), Professor, Professor, the Department of Forestry. Belarusian State Technological University (13a, Sverdlova str., 220006, Minsk, Republic of Belarus). E-mail: rozhkov@belstu.by

Yeroshkina Irina Fedorovna – PhD (Agriculture), Senior Lecturer, the Department of Forestry. Belarusian State Technological University (13a, Sverdlova str., 220006, Minsk, Republic of Belarus). E-mail: e_ira@belstu.by

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