TOURISM AND FOREST HUNTING MANAGEMENT

УДК 630*15+639.1

A. V. Bachur
Belarusian State Technological University

FORMATION OF STOCKS WOOD TWIG FOOD IN PINE PLANTATIONS AFTER THE PASSAGE OF GROUND FIRE

The studies found that under the influence of the pyrogenic factor there are significant changes in the composition of all tiers of forest communities. The changes have a direct impact on the transformation of post-forest vegetation, its diversity and dynamics. After passing through the ground fire to a general weakening and destruction of small-growing, stunted trees. The remaining trees in the stand lose some needles, especially in the lower third of the crown. All this leads to an increase in light under the canopy of the remaining tree stand, which affects the formation of under crown vegetation.

Restore damaged by fire stand depends on the intensity of the fire and stretched for quite a long period of time – up to 10 years, and in some cases and more.

After the fire, there is almost complete destruction of the living ground cover. Reduced competition from moss-lichen tiers leads to the emergence and proliferation of herbaceous vegetation. In herbaceous vegetation in the first years after the fire, there are a considerable number of nitrophilous species that gradually replaced typical forest species.

Mineralization of soil and increase light gives rise to a significant number of young growth of Scots pine. Further reduction of the main stand canopy reduces the viability of pine undergrowth, which is stored only in the form a “window”. Increasing the light also leads to the growth of underbrush species.

Increasing the undergrowth increases food and shelter habitat quality hunting animals. Since studies have found an increase in stocks of wood-twig food in 1.5–2.8 times in comparison with the control.

Key words: wildfire, undergrowth, underbrush, food resources, hunting animals.

Intoduction. Homogeneous forest areas with similar environmental conditions are united by types of forest hunting grounds. These forest areas are defined by similar environmental conditions for game animals habitation, and require similar management arrangements [1].

There are up to 3,252 cases of forest fire registered in the republic annually (2006), and most of them are ground fires. The number of fire cases depends on meteorological conditions during the fire danger season. Despite of the ongoing activities aimed at forest fire early detection and extinguishing, vast areas of forest stand are exposed to the fire negative effect. After a ground fire case the biocoenotic structure of the forest stand changes: the live ground vegetation, underbrush and undergrowth get destroyed, and the shade density increases under the canopy of growing stock. These processes ultimately lead to changes of the phytocenosis, as well as his feed and protective properties.

Main part. As it was mentioned earlier, most of the fires registered in the Republic of Belarus are ground fires of different intensities, that lead to the change in vegetation under canopy. Significant changes in the main layer appear as well: the trees are partially destroyed, the forest yield of the survived part is decreased and the acerose (leaf) is partially lost [2]. The soil mineralization and luminance increase under the canopy of growing stock ensure favorable environment for natural regeneration of a number of tree species, particularly common pine, that promotes increase of forage capacity of these forest lands.

We have chosen the forest stands that were affected by ground fire located at forest and hunting grounds of SFI “Rossony forestry” and SFI “Postavy forestry” as the research objects.

Information about forest fires broken-out on the territory of hunting grounds of SFI “Rossony forestry” and SFI “Postavy forestry” is given in Table 1.

The total area of ground fires in SFI “Rossony forestry” was 67.96 ha during 6 years and in SFI “Postavy forestry” was 24.5 ha during 10 years. It should be noted that fires occurred mainly in pine plantations.

We have arranged experimental plots (EP No. 1), 2008 (EP No. 2) and 2010 (EP No. 3) (Table 2) on the lands affected by forest fires in 2006 with the aim to determine the wood-twig fodder.

Table 1

Wood-twig fodder stock at experimental plots affected by ground fires in SFI "Rossony forestry", SFI "Postavy forestry"

Year	Type of fire	Total area affected by fires, ha	Total number of fires	Tree species
SFI "Rossony forestry"				
2006	Ground	46.83	30	Pine
2007	Ground	7.35	11	Pine
2008	Ground	3.80	3	Pine
2009	Ground	3.28	8	Pine
2010	Ground	5.40	2	Pine
2011	Ground	1.30	2	Pine
SFI "Postavy forestry"				
2002	Ground	0.6	1	Pine
	Underground	1.3	2	Birch
2003	Ground	0.3	1	Spruce
2004	Ground	0.38	1	Pine
2005	Ground	3.2	1	Pine
2006	Ground	2.0	2	Pine
2007	Ground	0.6	1	Pine
2008	Ground	13.7	6	Pine
2011	Ground	2.4	1	Pine

Table 2

Wood-twig fodder at experimental plots affected by ground fire in pine stand of SFI "Rossony forestry", kg/ha

Species	Wood-twig fodder stock		
	EP No. 1	EP No. 2	EP No. 3
Common pine	10.8	5.2	15.3
European white birch	22.3	25.1	11.2
Aspen	2.3	5.3	3.4
Rowan tree	0.9	–	–
European raspberry	–	3.4	–
Spruce	2.1	1.1	3.1
Total stock	38.4	40.1	33.0

The growing stock at the researched experimental plots is of diverse scorch height (66–115 cm average), light trees get destroyed, and the rest part of the trees loose acerose significantly, that leads to luminance increase.

The live ground vegetation is destroyed almost entirely, the moss and lichenous layer only starts getting recovered, and nitrophilous species dominate in the grass layer.

The forest litter burn-out leading to soil disturbance and luminance increase under the canopy of the growing stock create favorable conditions forunderbrush and undergrowth development, and as a result – increase of fodder capacity. In the forest stand affected by fires, the number of undergrowth increases in comparison with the control, with the greatest increment during the first 3–4 years.

When analyzing the data obtained on the wood-twig fodder, it can be noted that its formation depends on a variety of species of diverse trophic value. Common pine and European white birch can be found in undergrowth stand of all the forest stands. Pine is one of the principal types of fodder for elk in winter. Nutritional value of European white birch for hoofed animals is low. However, the most valuable tree species is aspen that can be found at the experimental areas, but its wood-twig fodder is considerably inferior to pine and birch.

In SFI "Postavy forestry" experimental plots were created in pine stands of the second class at the age from 55 to 75 years (Table 3). The scorch height on the pine stems ranges from 58 to 115 cm.

Ground fires of low intensity affected the forest stands at the first, third, fifth and sixth experimental plots in 2002, 2005, 2007 and 2008. Ground fires of average intensity affected the forest stands at the second and forth experimental plots in 2004 and 2006 respectively.

In forest stands affected by the fire, the lower thickness class trees lost the growth power completely or partially. This process was the most intensive at the second experimental area that resulted in necessity of selective salvage felling.

Table 3

Wood-twig fodder at experimental plots affected by ground fire in pine stand of SFI "Postavy forestry", kg/ha

Experimental plot	Standcomposition	Tree species in underbrush and undergrowth	Total stock
1-st	10P, 60 years, II growth class	Common pine, European white birch, aiten, rowan-tree	12.8
Control	10P, 60 years, II growth class	Common pine, European white birch, aiten, rowan-tree, black alder	6.2
2-nd	10P, 70 years, II growth class	Common pine, European white birch, aiten, black alder	18.5
Control	10P + S + B, 70 years, II growth class	Common pine, European white birch, aiten, rowan-tree, black alder	9.6
3-d	10P, 55 years, II growth class	Common pine, European white birch, black alder	25.5
Control	10P + S, 55 years, II growth class	Common pine, European white birch, aiten, rowan-tree, black alder	17.7
4-th	10P, 75 years, II growth class	Common pine, European white birch, aiten, rowan-tree, black alder	19.7
Control	9P1B, 75 years, II growth class	Common pine, European white birch, aiten, rowan-tree, black alder	12.7
5-th	10P, 60 years, II growth class	Common pine	15.8
Control	10P + S, 60 years, II growth class	Common pine, rowan-tree	5.7
6-th	10P, 65 years, II growth class	Common pine, European white birch	13.5
Control	10P + B, 65 years, II growth class	Common pine, rowan-tree, black alder	10.7

On experimental plots in pine stands in SFI "Postavy forestry" pine, European white birch and rowan tree can be found in the undergrowth. The results of the conducted research show, wood-twig fodder on experimental plots affected by fires is more than on the controlled ones. Comparison of fodder stock dispersions on experimental plots in the control and pyrogenousphytocenosis revealed statistically significant difference. This fact proves that formation nature of the under-canopy vegetation in pyrogenousphytocenosis differs significantly from the one in unaffected phytocenosis.

To compare the cervids appearing intensity in forest stands of experimental areas, the band discount areas of four meters length were created for experiments survey. Cervides appeared in all the pyrogenousphytocenoses. The most attractive were forest stands at the third and fourth experimental plots with the greatest wood-twig fodder.

Conclusion. Forest fires promote great amount of underbrush and undergrowth development under the canopy of the growing stock by changing the phytocenosis, thereby increasing the fodder capacity of these forest lands. Changes in pine phytocenoses lead to a qualitative transformation of the game animal habitat during 10 years after the ground fires, with the greatest stock of wood-twig fodder in 5–7 years after fires. Given the fact that forest fires occur annually in forest husbandry, their impact on fodder capacity change shall be considered while taking biotechnical measures.

References

1. TKP 291-2014 (02080). Terms of hunting structure: Minsk, Ministry of Forestry Publ., 2014. 50 p. (in Russian).

2. Usenya V. V., Katkova E. N. *Produktivnost' i vosstanovlenie lesnykh fitotsenozov posle pozharov* [Productivity and restore forest communities after fires]. Minsk, Belaruskaya navuka Publ., 2010. 247 p.

Information about the author

Bachur Aleh Vladimirovich − Ph. D. Biology, assistant professor, deputy dean of Forestry Faculty. Belarusian State Technological University (13a, Sverdlova str., 220006, Minsk, Republic of Belarus). E-mail: oleg_bahur@belstu.by

Received 22.03.2015