Short Reports

DYNAMICS OF STEPPE VEGETATION AFTER FIRE IN TUVA

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Currently, the issue of conservation of biological diversity is one of global environmental problems [1, 2]. Fires are an important ecological factor influencing species composition, functioning, seasonal and long-term dynamics of inland ecosystems. Especially significant is the role fires play in the formation and maintenance of biodiversity of the Eurasian steppes, the prairies of North America, the savannas of Africa, downblended New Zealand and other ecosystems.

In recent years, in the steppe zone of the Republic of Tyva (RT) increased unregulated fires. The main causes of fires is the anthropogenic factor, reducing grazing pressure, in which there is an accumulation of dead aboveground biomass. In addition, the emergence of steppe fires contribute to climatic conditions of the region, with frequent periods of summer drought. Dry the mortmass steppe grass is flammable during droughts. The fire spreads quickly, covering large areas. Often used by the population fire as land treatment to improve the quality of steppe grassland herbage.

For the conservation and management of biological diversity of natural ecosystems should be explored in detail the impact of fire on natural ecosystems. In our work the results of studying the influence of different timing of fires on vegetation component of steppe ecosystems of Tuva.

The aim of this work was to study the influence of different timing of fires on dry steppe plant communities of Tuva.

Study areas and Methods. The study was carried out on grasslands within Tuvinian steppes (48°–51° N 91°–99° E) of Central Asia. The climate of this area is characterized by a rigorous cold and late spring. The yearly mean temperature is – 5°C (1975–2010). The coldest month is January with a mean temperature of – 37°C. July is the warmest month with 17°C. On the basis of definition of the growing season as the period over which the daily mean temperature remains above + 5°C [3].

Steppes are linked to chestnut soils. Their species composition is dependent on relief, soil and anthropogenic load.

The soil at the study sites have developed on chestnut with sand material. The humus profile is 10–20 cm deep and roots grow down to 50 cm.

To study the effect of different terms has fallen on above-ground phytomass and species composition of the steppes us was founded experimental plots in Tuvinian dry steppes district RT. To bookmark the site was chosen ecologically homogeneous areas of steppe grass with minimal anthropogenic impact. The study area was divided into 5 variations of experience 100 m^2. Around the plot was laid down protective fire lane width of 3 m. the Burning of herbage produced in the following order: in mid-April 2009, in mid-may 2009, in the middle of June 2009, the middle of October 2009. Control plot action the fire has not been. In 2009, the experiment was expanded and similar versions of the experiments were planted on the South and North of RT. The distance between the Northern and southern areas within 250 km. The Study was conducted in 2009–2014.

Records of the aboveground biomass produced in mid-July 2009–2014 by cutting the plants at a height of 1–2 cm from the soil surface at sites 1 m^2 in five replications. In addition, each site was collected litter. The cuts were sorted into fractions of green plants and rags.

The biomass of living plants was dismantled by agro groups. The biomass samples were dried until totally dry condition and weighed on an electronic balance accurate to 0,01 g. According to the five replicates was calculated the average value and standard deviation.

Data on aboveground biomass of steppe grass were subjected to univariate analysis of variance. In our calculations we adopted a significance level of 0,95. According to the results of univariate analysis of variance was determined by the strength of influence of factor on Snedecor:

$$h_x^2 = \frac{s_x^{\,2} - s_e^{\,2}}{s_x^{\,2} + (n-1)s_e^{\,2}},$$

were $s_x^{\,2}$ – intergroup dispersion;
$s_e^{\,2}$ – intra-group dispersion;
n – number variant in a separate gradations dispersion complex [4].

The objects used the same versions of the experiments, and in the study of productivity. Geobotanical descriptions of the experimental variants was carried out in mid-July by using Braun-Blanquet method [5]. In this case, fixed all the species of higher vascular plants. Latin names of species are listed by Cherepanov S.K. [6].

The similarity of geobotanical descriptions of the variants of the experience was determined by the method of P. jacquard [7]. The coefficient of similarity jacquard (K_J) is calculated by the formula: $K_J = N_{A+B}/(N_A + N_B - N_{A+B})$, where N_{A+B} – total number of species in compared the descriptions of A and B, N_A and N_B is the number of species in each of the descriptions.

Results. Experimental data on post-fire dynamics of common stock of the aboveground biomass of steppe grass in the survey area dry

steppe indicate that fires, regardless of application deadlines, significantly affect the stock of total aboveground biomass. While post-fire dynamics of common stock of the aboveground biomass in different years varies considerably. Changes in aboveground biomass of steppe grass after burning, are confirmed by the results of analysis of variance. It is seen that in 2009 between the data of the total aboveground biomass on the experimental variants where used fire and control there is a significant difference. The force of the impact factor on the April version is 91 %, the may – 92 %, in June – 93 %. It should be emphasized that the April fire has no negative impact on the accumulation of aboveground live biomass. At a later date fire has a devastating effect on the living above-ground phytomass. In particular, the June embodiment, the force of the impact factor on live aboveground phytomass is 87 %. Fire significantly affects the accumulation of dead aboveground biomass of all variants. The strength of the factor in the first year and reaches 94 %.

Conclusions

So, after fire in mid-may live aboveground phytomass of steppe grass cover is reduced. Thus from the fire significantly damaged grains, legumes, sedges. It should be emphasized that the June fire exerts a most pernicious influence on the regrowth of aboveground live biomass. With steppe species of legumes and sedges stop the formation of the aboveground biomass to the end of the growing season.

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