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THE EFFECT OF GRAZING ON THE VEGETATION COVER ON THE STEPPES IN TUVA (RUSSIA)

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Steppe area, occupying only 8% of the land, provide 80% of humanity grain cereals, meat and other livestock products. Today, 90% of the area of the steppes turned into agrocenoses and semi-natural pasture, and preserved the virgin steppe are natural pasture land for grazing wild and domestic animals (Titlyanova et al., 2002).

The steppes of Central Asia belong to the steppes of Tuva, was the last person on Earth large steppe habitat, preserving steppe species and ecosystem diversity. These steppes supported human culture for thousands of years and during this period has undergone dramatic climate and social changes. In the past this area was little populated and low productivity of the herbaceous layer is quite security-shaft livestock products local people, leading a nomadic life. On native customs strictly regulate the nature of grazing – its timing, cycles, and duration. Due to the constantly recurring rest periods the state of steppe pastures was good. Currently, however, significant areas of the steppe are under heavy grazing pressure, which can lead to their degradation.

The purpose of the study – to reveal the character of changes of vegetation of the steppe pastures in the intermountain depressions in Tuva, depending from the stage of pasture digression.

The object of study – steppe vegetation grassland of pastures of the intermountain depressions of Tuva. Materials for investigation were collected during 1996–2016.

Study of the grazing influence to species composition of plant communities, the structure of phytocenoses, the productivity of the steppes and their dynamics under the influence of changing grazing regime relevant in theoretical terms in terms of biodiversity conservation, and in practical terms from the point of view of conservation of natural renewable resources.

The detection of patterns enables to determine the period of grazing of the steppes, to develop methods for the regulation of pasture load and activities to keep them in optimum condition, you will serve as the basis of strategy of management of the steppe ecosystems for their rational use, and the global strategy for plant conservation.

Materials and methods of research. The study was carried in geographical region of Central Asia – in the intermountain depressions of Tuva, that located in the southern part of Tuva on the boundary with Mongolia. In Tuva were investigated dry steppes with different grazing impact (Table).

Annual precipitation in Tuva steppes varies from 150 to 170 mm. The seasonal distribution of precipitation is rather constant: 70–80% of the annual total falls during the warm half of the year. The yearly mean temperature at Erzin is – 4,5 °C. The coldest month is January with a mean temperature of – 33 °C. July is the warmest month with 22.0 °C. The growing season, i.e. the period over which the daily mean temperature remains above + 10 °, lasts 130–140 days and the period with temperature above 0 °C – 180–190 days. The potential evapotranspiration for the growing season is about four – five times higher that the annual precipitation due to the high wind speed and a lot of very hot days with t° above 30 °C. The steppes of Tuva belong to the ultracontinental grassland type.

Description of the site investigated

Region	Coordinates	Altitude, m	Ecosystem type	Ann. prec (mm)	Ann. temp.(°C)
Tuva	49°40′N 95°03′E	1100	Dry steppes	150–170	– 4,5

Results of research and their discussion. Tuva (Russia) steppes belong to Central Asia (C.A.) subregion of steppe region of Eurasia. In C.A. steppe communities feather-grasses from section *Leiostipa* (*S. krylovii, S. baicalensis, S. grandis*) dominate and on the West of the subregion *S. capillata* and *S. sareptana* prevail. Desert steppes are dominated by lowfeather-grasses from section Smirnova (*S. gobica, S. glareosa, S. klemenzii*). Among small-bunch grasses in true and dry steppes dominate *Cleistogenes squarrosa*, *C. songorica, Agropyron cristatum, Koeleria cristata, K. macrantha, K. altaica, Poa attenuata, P. botryoides*. Species of *Festuca* (*F. lenensis, F. kryloviana, F. valesiaca*) are found only in the mountain steppes.

Semishrubs from section Artemisia (*A. frigida, A. xerophytica, A. caespitosa*) are common to a wide variety of steppes. Under grazing impact *A. frigida* abundance usually increases. Steppe shrubs from genus Caragana (*C. microphylla, C. pygmaea, C. stenophylla*) occur in true and dry steppes, *C. leucophloea* – mainly in semidesert and desert steppes. Peculiar feature of Central Asia plant cover is the abundance of herb-bunch steppes dominated by *Filifolium sibiricum* and rhizome-grass steppes dominated by *Leymus chinensis*.

In Tuva winter pastures were supplied with pump-houses to provide a livestock with water. After collective farm disruption these pump-houses were demolished and pastures were left without water. Many winter pastures were abandoned and herdsman have driven their flocks into river valleys. Many summer pastures transformed into full year ones with heavy grazing impact. Change of stocking rate leads to degradational or restorational succession which can be observed and investigated then and there.

Steppe grazing pastures in different natural zones in Tuva lead to different results. So, the steppe vegetation is in different stages of the pasture digression, which depend on the volume of pastures′use, the duration you pass and pasture load, type of cattle, environmental conditions. The proportion of severely degraded pastures is constantly increasing. Economic well-being of shepherds depends on the rational use of steppe pastures, which is impossible without the study of patterns of change in vegetation influenced by grazing and conservation of traditional animal husbandry. So, in the intermontane depressions of Tuva is dominated by *Stipa krylovii*, *Koeleria cristata* dry steppes which for a long time under the influence of the pasture load. The total reserves of the vegetable ingredients of these steppes does not exceed 3500 g/m^2. Light grazing leads to the development of the fineturf communities that are resistant to grazing. Total reserves of plant matter closer to 2800 g/m^2. When removing the pasture load, after 15 years of reservation, plot the change of vegetation in *Stipa krylovii* steppe. Total reserves of plant substances increase to 3500 g/m^2. Dead aboveground plant phytomass substance exceeds 1,5–2 times. Underground vegetable matter also increases significantly, and the proportion of live roots of dead exceeds 1,5 times. Overgrazing also leads to a change in vegetation cover. Submitted steppe *Artemisia frigida, Potentilla acaulus* associations with low total reserves of vegetable substances. In the underground sector is dominated by dead undecomposed fraction. When over-grazing of the locations of the old herders lots where vegetation cover is destroyed almost completely, there is a radical change of vegetation. Revegetation of a long time are directed towards the education of the community of weed species that are not in natural cover.

Conclusion

Analysis of the data shows that the state of the vegetation associated with social and economic development of the country. Tuva belongs to the old agricultural areas, as in ancient times (III century BC) the territory was inhabited by pastoral tribes, concentrated mainly in intermountain basins to the river valleys, the most favorable for development of cattle breeding and agriculture.

Extremely alarming is the fact that the area of degraded lands in Tuva is growing steadily, therefore, should establish the optimal ratio between the number of cattle and area of pastures.

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