

Short Reports

THE DYNAMICS OF THE BIOLOGICAL PRODUCTIVITY OF BIOMES TUVA

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Under the human activity is a significant part of the natural biomes replaced anthropogenic: crops, tree plantations and gardens, as well as man-made ecosystems.

Vegetation as a self-replicating resource biosphere is the component that captures solar energy and produces organic matter. The use of vegetation as a food is the Foundation of life and the development of other self-replicating resources, including humans. It presents a huge number of species composing the community and biomes.

The objective monitoring of the biological productivity of major biomes composing the vegetation of Tuva. In the present work for the first time the analysis of its dynamics and the distribution between major biomes of Tuva, the removal of vegetable matter and receipt of plant residues in the soil.

Materials and methods of research. The productivity of ecosystems reflects the biological potential of the system and is characterized by two parameters – the stock of phytomass and net primary production (NPP), i.e. the quantity of organic matter produced by green plants per unit of time (month, year) per unit area (m^2 ha) [1].

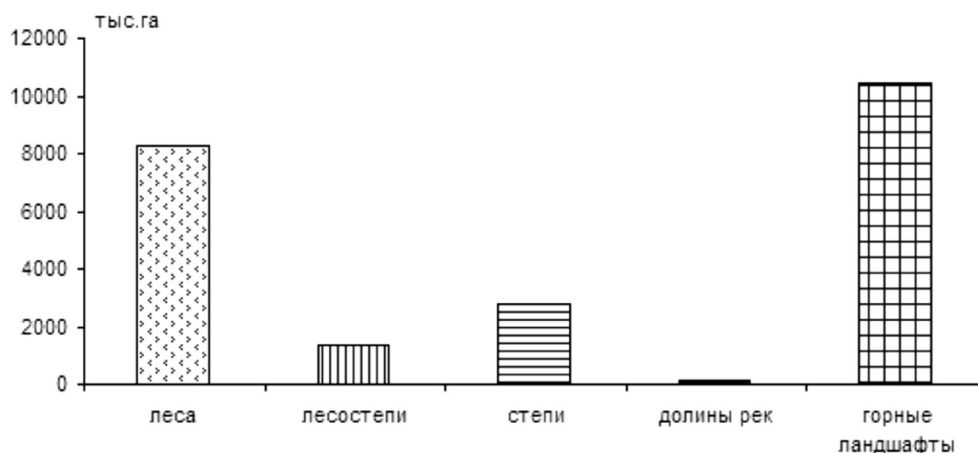
Our own studies on the productivity of ecosystems, in particular, the dynamics of stock biomass, net primary production, also the removal of vegetable matter and receipt of plant residues in the

soil were carried out in different biomes Tuva from 1996 to 2009.

Results of research and their discussion. The Republic of Tuva is located in the South of Russia, in the Central part of the Asian continent. Mountain hollows relief of the Republic defines within it a complex combination of bioclimatic conditions, uniqueness and heterogeneity of soil and vegetation cover.

The climate is sharply continental. Features a short but hot summers, long and snowy winter, prolonged droughts. The average January temperature ranges from $-28^{\circ}C$ to $-35^{\circ}C$, July $15-20^{\circ}C$, the snow depth is 10–20 see According to the scheme agroclimatic zoning of the territory of the Republic is characterized by insufficient and poor wetting (GCT is 0,4), where in the basin the average annual rainfall of 250–300 mm of rain in the mountains – 700 mm Under the influence of climatic conditions in the river valleys and lowlands developed Chernozem leached and podzolized, within the steppe inter – mountain basins-a group of soils in the steppe and dry steppe soil is dark brown and black soils of the southern and South of the Republic in the area with extremely high moisture deficit are formed a series of soils in the dry steppe and desert-steppe soil, mostly chestnut and light chestnut [2].

For research conducted structuring of landscape zones, biomes and types of land use Tuva. As a landscape zones: taiga, forest-steppe, steppe, mountain landscapes and river valleys (figure). Biomes are defined by vegetation type and include forests, grasslands (steppes, meadows, and grassy marshes), mountain ecosystems (talus, cliffs, open grouping of vegetation, tundra). Types of land use include: crops, hay and pasture, intensively managed forests, disturbed lands – Gary, cutting, ravines, anthropogenic agglomerates – cities, towns, roads and other.



The structure of the vegetation cover of Tuva

The total area of Tuva is 170,5 thousand km². As in other areas of the mountains of southern Siberia, on the territory of Tuva vegetation obey the laws of altitudinal zonation with a well-marked mountain, the mountain and steppe zones.

Tuva is an old agricultural areas, because even in ancient times (from III century BC), its territory was inhabited by pastoral tribes, focusing primarily in the intermountain basins, river valleys, the most favorable for development of cattle breeding and agriculture. For millennia, the economic impacts to vegetation gradually increased in two main areas: the destruction of indigenous vegetation by changing the grass under the influence of grazing and ploughing. And since 1940 the replacement of natural ecosystems into agricultural lands leads to changes in their productivity.

Stocks of biomass, mortmass and products

In the process of producing biota, quantitative expression of which is net primary production, creates not only a new phytomass, but also consumes carbon dioxide and released oxygen. In this regard, the stock of phytomass, mortmass and value of production estimated for the territory of Tuva, characterize its action potential.

Mountain the face of the Republic determines its phytomass and distribution of the latter between biomes. Mountainous landscapes, including mountain tundra, dwarf birch, an open grouping of plants, constitute 22% of the territory of the Republic. All these ecosystems have low phytomass and production. Their contribution to the phytomass is 3.5%, in mortmass much more – 16% and in production – 6%.

The main area of the biome of the Republic of forests, which occupy 52% of the area of the Republic. Grassy ecosystems is much more than agricultural, industrial and residential landscapes in last place, occupying only 0.3% of the area of the Republic.

Forest vegetation of Tuva dedicated to mountain elevations and consist mainly of Siberian larch and cedar, which occupy and 47,1 44,7% of forest area. Total wood reserves are estimated at 1090,85 million m³, of which the share of Siberian larch has 51,8 and cedar – 43,1%. Forest lands constitute 95% of phytomass and 72% mortmass. In the product composition, the share of forests is much less – only 46%.

A small area (24%) are in the grasslands – grasslands in the valleys, subalpine and Alpine meadows in the mountains. The density of the phytomass of grass ecosystems reaches 4.1 t/ha, due to the high stock of living underground organs of plants meadow and real steppes and Alpine meadows. The low density of biomass is due to the fact that the main type of virgin grassland ecosystems in Tuva – dry and desert steppes, phytomass which is significantly lower than the biomass of meadow steppes. High density mortmass grassy ecosystems – 5,5 t/ha due to deposition in the soil of a large number of dead decayed roots and rhizomes. High and products are

herbal ecosystems, constituting 48% of the NPP of the vegetation cover of the Republic.

Very small area of agricultural lands (1,5%), which explains the very low contribution of this biome in the phytomass and production. The phytomass of agrocenoses basically form a grain and fodder crops, industrial crops and vegetables occupy a small area. Inventories mortmass one and a half times lower than stock biomass. The contribution of forests to mortmass below, and grassy ecosystems is higher than in the phytomass.

Conclusions

As a result of monitoring the various biomes of Tuva revealed that they differ in size, climate and landscape structure. 17,000 hectares of the total area of the Republic 8278 thousand ha are forest, 1355 forest steppe and – 3298 steppe zone. Therefore, they have different values and phytomass and production, also, these figures do not correlate with the area of the zones.

No direct proportion between the area on the one hand, phytomass and production on the other hand is associated with various biom structure zones. The largest stock of phytomass in the first place is determined by the area of forests of the Republic. The main type of transformation here is characterized by a small area of intensively managed plantations, deforestation and fires, and employed anthropogenic agglomerates – cities, towns, roads, mining, industrial facilities and other. The value of products is also not related to the total area of the zones and depends on the area of grass ecosystems, characterized by the highest among the existing in Tuva ecosystem products. The main producers are grassy ecosystems, forming 48% NPP, the contribution of forests reaches 46%, agrocenoses 1,5%, i.e. more than 90% of the products in almost equal amounts to create a forest and grassy biomes.

The high production of grass ecosystems is causing the reproduction of their biomass in one year or less. The latter means that in one year, growing and dying more biomass than is contained in the average per unit area. In agrocenoses to harvest at the moment which is estimated phytomass, some leaves, whole plants, roots is dying out and is not included in the phytomass.

So, the higher the participation rarely used in the economic activity of forest vegetation of the Republic, the higher phytomass and longer time of reproduction of the biota. The higher participation of grass ecosystems, the higher production and less time on their reproduction. The maximum change in the flow of crop residues into the soil occurs in agrocenoses.

References

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