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DETERMINATION OF PHYTOMASS SPECIES DIVERSITY IN MOUNTAIN-FOREST BROWN AND MOUNTAIN-FOREST BROWN SOILS IN RECENT YEARS

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Abstract. Mountain-forest brown soils are common in the zone of mesophilic forests. The vegetation is represented mainly by beech, beech-hornbeam groups with an admixture of maple and ash, forming a dense forest canopy, strongly shading the soil surface. As dead-cover forests, they are characterized by a weak development of undergrowth and herbaceous cover with abundant accumulation of forest litter. The climate ensures the development of lush, high-quality forest vegetation with a predominance of Eastern beech and Caucasian hornbeam. Forest cover is 80% to 90%, the forest type of soil formation prevails here. Studies have established that phytomass reserves in oak-hornbeam forests are 116-274 t/ha, and in shrub-herbaceous cenoses, plant biomass varies within 27-35 t/ha. In these soils, the penetration of humus into deeper horizons is associated with the active participation of the root system of herbaceous plants in humus formation. Mountain-forest brown soils developing under deciduous broad-leaved groups are characterized by the annual accumulation of a large amount of forest litter 12-13 t/ha. There is an active interaction of the decomposition products of the litter with the mineral part of the soil.

Keywords: *Forest cover, tree species, undergrowth, biodiversity, vegetation.*

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1. Introduction

The territory of the Republic of Azerbaijan has a rich flora. In relatively large area all kinds of plants that found in the world, were spread in the republic. For the total number of species of the flora Azerbaijan is richer than any other Caucasus countries. Kinds of vegetation found in republic consist of 66% of the total amount of plant species growing in the Caucasus. Besides widely spread plants in the Caucasus and other regions, about 240 endemic plants specific just to the Azerbaijani flora exist here. Spreading of vegetation is conditioned by the formation of the region from physical and geographical points of view, current climate and soil conditions, the vertical landscape and a number of other factors. When studying the soil-forming process of mountain forest brown and mountain forest brown soils, a special place was given to vegetation cover (Aliyev, 1978; Asgarova & Hasanova, 2022; Babaev *et al.*, 2011; Mamedova, 2006).

The studied mountain forest brown soils are located in the zone of xerophilic forests and shrub steppes. The vegetation is represented by xerophilous tree and tree-

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shrub groups. The forests are represented mainly by oak-hornbeam, tree species. In drier variants, arid-sparse forest groups were developed, represented by pistachio-juniper formations, as well as shrub communities. From relict and rare trees of the third period growing in Talysh mountains iron tree, Lankaran acacia, chestnut oak, azat, the Caucasus date, box-tree, wing nut, Hirkan fig-tree, Hirkan birch, etc. are rare pearls of nature (Hasanova, 2015; Salaev, 1991).

Usually, these soils are most typically developed under oak-hornbeam forests with well-developed undergrowth and xerophilic herbage. Relatively drier variants of brown soils developed under arid woodlands, represented by pistachio-juniper formations. In some cases, the forests are sparse with well-developed undergrowth and herbaceous cover. Mountain-forest brown soils are common in the zone of mesophilic forests. The vegetation is represented mainly by beech, beech-hornbeam groups with an admixture of maple and ash, forming a dense forest canopy, strongly shading the soil surface (Hasanova & Mammadova, 2021; Salaev *et al*., 2004).

As dead-cover forests, they are characterized by a weak development of undergrowth and herbaceous cover with abundant accumulation of forest litter. The climate ensures the development of lush, high-quality forest vegetation with a predominance of Eastern beech and Caucasian hornbeam (Hasanova, 2015).

Soil is one of the most important natural resources and represents the basic base for the production of organic matter. Soil is a natural substrate from which plants draw essential elements that are necessary for their proper growth and development (Shchipanova, 1971).

Forest cover is 80% to 90%, the forest type of soil formation prevails here.

Studies have established that phytomass reserves in oak-hornbeam forests are 116-274 t/ha, and in shrub-herbaceous cenoses, plant biomass varies within 27-35 t/ha. In these soils, the penetration of humus into deeper horizons is associated with the active participation of the root system of herbaceous plants in humus formation. Mountain-forest brown soils developing under deciduous broad-leaved groups are characterized by the annual accumulation of a large amount of forest litter 12-13 t/ha. There is an active interaction of the decomposition products of the litter with the mineral part of the soil.

2. Objects and research methodology

The study of phytocenoses was carried out on the example of mountain-forest brown (Masalli) and mountain-forest brown (Yardimli) soils. Natural biotopes under woody vegetation with grassy cover were chosen as objects of study. On these biotopes, according to the method of Bystritskaya and Osychnyuk 1975, an account was made of aboveground herbaceous phytomass from an area of 1 m^2. On the same plots, vegetation litter was determined and then the total aboveground phytomass was calculated.

3. Result and discussion

Studies conducted to determine the quantitative indicators of phytomass revealed some differences between mountain forest brown and mountain forest brown soils.

If in mountain forest brown soils, the total raw phytomass (herbaceous) is 1077 g/m^2, then in mountain forest brown soils its reserves decrease to 712 g/m^2.

Comparing the data obtained with literary materials, a significant decrease in reserves of natural vegetation is noted, which is apparently associated with global changes in environmental conditions. The determination of the litter reserves on which the formation of humus also revealed their reduction.

In mountain-forest brown soils and mountain-forest brown soils, the reserves of wet litter vary between 1676 g/m^2 and 792 g/m^2, respectively, and their dry weight decreases to 528 g/m^2 and 116 g/m^2 (Fig. 1,2)

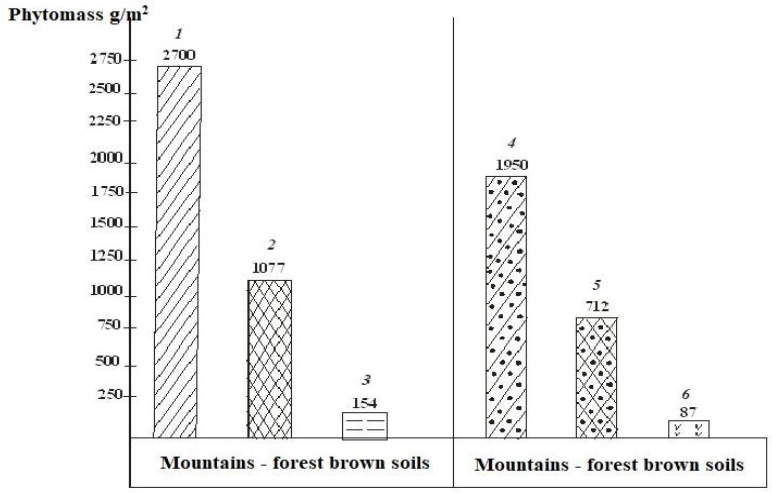

Fig. 1. Phytomass, g/m^2 (grassy) in mining brown brown and mining brown soils
Conditions: 1; 4 – M.P. Babaev, V.G. Gasanov, Ch.M. Jafarova, S.M. Huseynova, 2011.
The author's data 2; 5 - raw phytomass 3; 6 - dry phytomass

The most important feature of the primary production of ecosystems is its assessment of free energy in support of the flow of biological cycles. The phytomass of the Earth is the only source of primary production, which determines the potential for the existence of all living things. While plants are a key component of primary productivity, other organisms, such as chemoautotrophs, are a key source or the only source of primary productivity in certain systems.

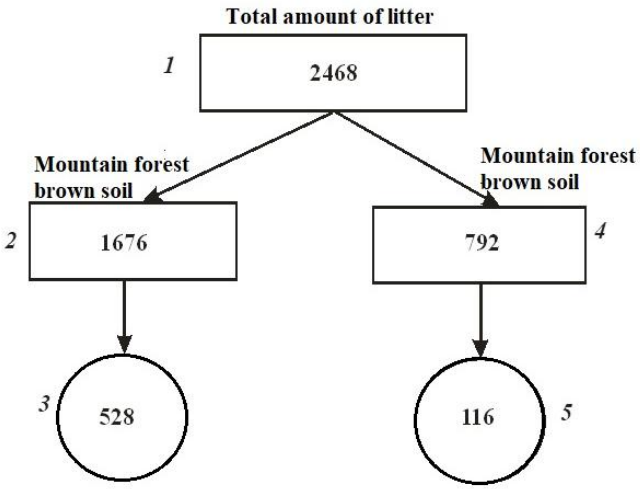

Fig. 2. Change in litter reserves (g/m^2) in mountain forest brown and mountain forest brown soils
Conventions 1 - total litter supply, 2;4 - the amount of wet litter, 3;5 - the amount of dry litter

The productive ability of land is a factor that determines the productivity of agricultural production and implies the ability of plants to be supplied with water and essential minerals through the root system. Soil fertility is another important factor of any agricultural land. Fertility is a dynamic state of various physical, chemical and biological properties and processes in the soil, thanks to which a different degree of life of plants, animals and even humans is possible. (Table 1.)

Table. 1. Microelements in mountain forest brown and mountain forest brown soils

Genetic layers and depth, cm	B	Mn	Cu	Co	Zn	Mo
AUv 0-18	25	470	27	15	27	8
AUq 18-32	18	301	21	11	16	6
Bqr 32-75	20	632	23	12	21	5

Agrochemical fertility of soil implies chemical properties of soil that are determined by the content of macro and microelements and the absence of soluble forms of harmful elements

4. Conclusion

- Determination of phytomass showed that in mountain-forest brown soils and mountain-forest brown soils its amount varies between 1077 g/m^2 and 712 g/m^2, respectively.
- The amount of litter in these soils was 1676 g/m^2 and 792 g/m^2, respectively.

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