Natural reafforestation as an optimization factor of carbonic balance at health resorts of Stavropol Region

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Nowadays the role of woods and their rehabilitation is regarded in terms of atmospheric carbon storage as the result of the increased emission of greenhouse gases (CO_2, SF6, CH4, HFC5, PFC5, etc.) in recent years. The forests of Stavropol Region (SR) due to forest vegetation conditions can deposit from 0,6 to 0,8 t/hectare of carbon dioxide per year [1] – from 77 000 to 103 000 tons per year which can be compared to anthropogenic emissions of carbon products in atmosphere. So forest restoration and forestation issues are very acute taking into consideration low percentage of forest land in SR (1,5%, with forest shelter belts -3 %).

Quantitative characteristics study of renewal process and light status on the forest areas of Caucasus Mineral Waters Resorts of SR (percentage of forest land 7%) was carried out according to the samples of branch standard (BS) 56-69-83 [2]. Young growth assessment was implemented on the areas of 4 sq.m in size (2 x 2m or R - 1,13m), placed on the area homogeneously (25 pieces on each sample). Illumination and bioclimate of forest samples were studied by means of Electronic Technology Sistem (Germany) and a meteoparameter gauge ATT-9508 (Taiwan).

On the sample areas the measuring was made according to the profiles crossing the sample in the points, evenly remote from each other (50 - 100 pieces at the height of 0, 0, 0,5 and 1,0 m above soil level).

As a result of the research there has been resolved that the illumination factor of the surface space is the factor limiting the process of natural forest restoration. Taking into consideration the given data about plantation light conditions and woodless areas, we have calculated a regression model of the certain undergrowth quantity of main hard deciduous species (an oak, an ash-tree, a hornbeam, a maple, etc.) depending on the place of growing - C0-3; D0-3 – and surface illumination (% from full illumination). The empirical model has a parabolic form:

=-1,1870230+0,613871381-0,004526772;

R = 0,84; R2 = 0,70; p = 0,000001;

where, Y – a certain undergrowth quantity of main hard deciduous species (1000 pieces per hectare); X – surface illumination, %; R – correlation coefficient; R2 – determination coefficient; p – significance.

According to the results of the research there have been developed and approved highly efficient recommendations of reforestation works in the mountainous health-resort areas of SR subject to solar illumination and bioclimate of various orientation slopes.

References:
1 . Martynov A.S. Artyukhov V. V. Vinogradov V. G. Health and environment. Web Atlas. 1998 (C).
2 . Sample forest areas. Forest management method. BS 56-69-83. Official edition. M, 1983. - 60 p.