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Methodological approaches to the assessment of ecological forest potential in Caucasian Mineralnye Vody region

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Forest Ecosystems (FE) have a leading role in the organization of mountain resort study. The assessment technique of medical potential of FE is based on the analysis of its productional activity which depends on a set of radiation, atmospheric, biospheric processes concerning various parts of FE and inseparably connected with one another [1]. The ecological potential, among a set of factors, has a great influence on the medical potential of FE. It has been calculated according to the model SRIMOUNFORESECOLOG[2] based on the coefficient of ecological potential (CeP) of the forest:
CeP = (1,0221*(1-(-0,36225*(*))) [U+02C4] 2,1878) * Rnb, where
A is a chronological age in decades; is a relative forest density, in ratio 1.0; Rnb is a reduction rate expressed by the relation of the stock volume of the given quality class to the stock volume of the 1st quality class at basal age (130 years old). The technique is supplemented by the corresponding tables and tablets.
By means of the model there has been conducted an assessment of ecological forest potential of the resort Caucasian Mineralnye Vody region consisting of Fraxinus excelsior L. by 50%, Carpinus betulus L. by 30%, Quercus robur L. and Quercus petraea (Matt.) Liebl. by 20%. The average weighted density of forest species is 0,71. Considering the age of the woods (8 C.), CeP is equal to 0,44, which corresponds to the critical condition of ecosystem connected with the low value of the quality class (III.1) caused by weak biological stability of natural shrub woods of multiple life cycles because of continuous clean cutting of recent years. At the same time, the ecological potential of cultivated complete stands of the fifth class, the age of the first quality class for Quercus rubra L. is characterized as high (CeP =0,92), Pinus pallasiana D. Don, as more than sufficient (CeP =0,88), Pinus kochiana Klotzsch ex K. Koch) is sufficient (CeP =0,82). The received results confirm successful performance of ecological functions by these plantings.
Conclusion: the use of integrated approach to the assessment of CeP allowed to increase the assessment accuracy of integrated landscape and climatic potential for the purposes of mountain balneology and to reveal ecological threats connected with forest exploitation violations (deforestation, undesirable successions, mistakes in forest planning) and to plan perspective actions to increase stability and efficiency of FE use.

References

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