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BIOPRODUCTIVITY OF CONIFEROUS FOREST IN UKRAINIAN CARPATHIANS

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Geographical position of Ukraine on the map of Europe more and more often becomes a point of interest of Ukrainian and foreign scientists and politicians on biotic potential of its forests from point of view of securing the needs of society in renewable energy sources and ecological stability of the environment in conditions of global climate change. All this impels Ukrainian scientists to participate in numerous international projects and programs devoted to this range of problems.

When integrating into the European community, Ukraine cannot stay aside from important international agreements on solving the urgent ecological problems, linked with climate change. The primary priority in solving the problem described above is currently recognized to be laid upon forests. Thus, management of ecological resources and carbon balance of forest ecosystems on global or regional level is possible only by presence of adequate information basis on biotic potential of forest biocoenoses.

Currently coniferous forests are an important structural component of the system of forest resource supply and ecological stabilization of the environment in Ukrainian Carpathians. Quantitative parameters of amounts of live biomass of coniferous stands and sequestered carbon characterized by positive trends. This is due to both changes in their age structure and qualitative changes of composition of forest stands – creation of mixed and more biologically stable spruce-fir-beech stands instead of vulnerable spruce monocultures in Ukrainian Carpathians. During the last 10-year period its amount has increased by 31.7 %. This trend is a proof of sustainability of forest management and, as a consequence, of positive impact on the environment and resource potential of forestry. From the assessment as of

1.01.2011 it is found that total amount of live biomass accumulated in coniferous forests of Ukrainian Carpathians is estimated 172.2 Tg (1 Tg = 10^{12} g = 1 mio. tons) of dry organic matter or 85.7 Tg of sequestered carbon.

Speaking about component structure, it is worth saying that a fraction of live biomass of trees is 99.0 % of the total amount of live biomass of phytocoenoses of coniferous tree species, of which 80.0 % is aboveground live biomass. Understorey vegetation share is only 1 %. The share of live biomass of tree trunks is 65 %, of which 8 % is live biomass of bark. Live biomass of tree crowns makes up 14.2 % of the total amount of live biomass: 8.9 % – live biomass of branches over bark and 5.3 % – photosynthetic apparatus (needles). The share of root systems is 19.8 %

One of the most important indicators and components of bioproductivity of forests is net primary production (NPP). Quantification of NPP is the necessary precondition for assessment of carbon budget of forest phytocoenoses on certain territory. This index indicates response of the environment on the climate change.

Net primary production of coniferous forests of Ukrainian Carpathians reaches 8.32 mio. tons·year^{-1} (on average – 868 g·(m^2)$^{-1}$·year^{-1}). It must be mentioned that for boreal forests of Europe this index is equal 920 g·(m^2)$^{-1}$·year^{-1}).

In conditions of European integration, ecological component of forest mensuration and inventory science as well as fundamental and applied research of ecological functions of forest phytocoenoses, which determine processes of climate and water resources formation on the substantial part of the continent, have become a necessary condition for sustainable forest management in Ukraine as well as for keeping the declared international ecological agreements. One of the main indices of ecological functions of forests are quantitative parameters of live biomass and net primary production, which reflect the resource of forests in terms of environmental protection.