

## **BIOPRODUCTIVITY OF HARDWOOD DECIDUOUS FOREST IN UKRAINIAN CARPATHIANS**

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*An assessment of state of hard wood deciduous forests of Ukrainian Carpathians has been done. The results of the assessment of parametrical structure of their biological productivity on basis of data of state forest account (as of 1.01.2011) and model toolkit using experimental data are presented. The quantitative and qualitative parameters of live biomass amount (280,1 mio. tons, or  $25,1 \text{ kg} \cdot (\text{m}^2)^{-1}$ ), carbon sequestered (139,7 mio. tons, or  $12,7 \text{ kg} \cdot (\text{m}^2)^{-1}$ ) and net primary production ( $15,8 \text{ mio. tons} \cdot \text{year}^{-1}$ , or  $1414 \text{ g} \cdot (\text{m}^2)^{-1} \cdot \text{year}^{-1}$ ) in stands of hard wood deciduous tree species are determined.*

*Ukrainian Carpathians, oak, beech, phytomass, carbon sequestered, net primary production.*

In the Carpathian region of Ukraine, where the forests cover more than a third of the territory (as of 1.01.2011 woodiness of the region is 36.8 %) and have a dominant functionality to perform an important ecological functions, the research of their biological productivity as one of the basic criteria for establishing the biosphere role of forest communities, is essential for evaluation of national and European potential of natural resources in mountain areas. In this context, special scientific attention should be paid to hardwood deciduous forest in the region, the area of which contains about 1 million hectares.

Currently hard wood deciduous 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 hard wood deciduous stands and sequestered carbon characterized by positive trends.

During the last 10-year period its amount has increased by 37 %. 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 280.1 Tg ( $1 \text{ Tg} = 10^{12} \text{ g} = 1 \text{ mio. tons}$ ) of dry organic matter or 139.7 Tg of sequestered carbon.

Differentiation of quantitative indicators of phytomass volumes on the covered with forest vegetation forest areas is quite significant, both in regional terms, and depending on the species composition and age structure of forest stands.

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. Understory 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). This index indicates response of the environment on the climate change.

Net primary production of hardwood forests of the Carpathians is quite high – 15.75 million  $\text{t} \cdot \text{year}^{-1}$  completely dry organic matter, or an average of  $1414 \text{ g} \cdot (\text{m}^2)^{-1} \cdot \text{year}^{-1}$ . In the researched region the highest rates of NPP density are characteristic of beech stands –  $1438 \text{ g} \cdot (\text{m}^2)^{-1} \cdot \text{year}^{-1}$ , which is 40 % above the average Ukrainian forests indicator and 11.9 % above of the medium density of hardwood plantations NPP of Ukraine ( $1285 \text{ g} \cdot (\text{m}^2)^{-1} \cdot \text{year}^{-1}$ ).

The results of the quantitative evaluation of living organic matter volumes and net primary production of the hardwood deciduous forest of Ukrainian Carpathians reflect current parameters of natural resources potential of the studied plant communities. For these indicators hardwood forests of the region are the dominant element in the ecological stabilization of its natural environment and important subject that needs conservation, restoration and implementation of forest management on the principles of sustainable development.