

AN IMITATING MODEL OF CARBON ACCUMULATION IN WOOD COMPONENTS OF MAN-MADE PINE FORESTS IN POLESSIE

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From our opinion, it is more rational to use the imitating models in modeling of bioproduction processes. They are based not on the determination relationship between signals on inputs and outputs, but on the probability relationship. That models more exactly reflect the character of functioning of the natural ecosystems.

We have designed an imitating model of carbon accumulation in man-made pine forests on the basis of statistical analysis of multiyear observation in permanent sample areas. Structure of model is similar with the structure of production processes in tree communities under various internal and external factors. In inputs of model are information of initial state of ecosystem (site class, forest age, density, average diameter), weather conditions (average temperature of vegetative period and period of dormancy), level of technogenous pollution and program of cutting. In output of model is the information of carbon stock distribution in age section. Information are calculated in eight blocks for carbon stock counting: block for taxation parameters counting; block for trees diameter increase counting; block for trees dead prognosis; block for felling calculation; block for counting of carbon stock in dead wood; block for technogenous coefficients counting; block for weather coefficients counting; random numbers generator. In modeling we have taken into account the processes of dead wood decay.

The area of application of this model is the pine man-made forests, age 10 – 90 years, site class 23 – 33 m in 100 year, stock 0,6 – 1,3, level of technogenous pollution from low to degradation of forest, changes of year average temperature ± 4 °C. Model had been made as computer program in Object Pascal. Tests had indicated a sufficient level of adequacy, stability and sensitivity of imitating model.

The model had allowed us to detect upper limits of carbon stock in different pine forests, influence of climate changes and technogenous pollution on rate of carbon dioxide absorption in pine forests. We had proved forestry action to improve carbon function of forests with this model.

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