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THE METHOD OF CALCULATING OF THE RELATIVE GROWTH RATE AND THE NET ASSIMILATION RATE INTO PLANT LEAVES ON THE EXAMPLE OF WINTER WHEAT

The mathematical models of the functional dependences (the second-degree polynomial) of the relative growth rate RGR_{UL} and net assimilation rate NAR_{UL} into the winter wheat upper leaves (ul) on time t (day) are proposed. The mentioned models are constructed on the basis of an empirical polynomial function of the third degree, which determines the dependence of the logarithm of the dry matter content in the considered organs lnW_{UL} on the time t (day). The mathematical model of dependence of NAR_{UL} on time includes the second variable – the ratio of dry matter content into the winter wheat top leaves to the area of these organs – $W_{UL}/S_{UL} = LMA_{UL}$ (leaf mass per area ratio). Using the obtained models, a calculation of the instantaneous values and quadratic errors of the representativeness of RGR_{UL} , NAR_{UL} into the upper leaves of plants under control conditions and the action of ecologically safe fertilizers systems during phases of ontogenesis booting, earing, flowering, milk ripeness (respectively 0; 7; 14; 26 days of the accounting period) is carried out.

The dynamics of instant RGR_{UL} , NAR_{UL} can be further studied in detail by methods of mathematical analysis. In particular, it is possible to find approximate values of RGR_{UL} , NAR_{UL} , which are located within the accounting period.

The coefficients of the proposed power polynomial functions are empirical numbers and have no biological significance. To obtain the numerical form of these coefficients, it is necessary to construct an empirical diagram of the polynomial dependence of the third power of lnW_{UL} on time (t , day). The indicator $W_{UL}/S_{UL} = LMA_{UL}$ should be calculated according to the experimental values of W_{UL} , S_{UL} for a given moment t_i , for which RGR_{UL} , NAR_{UL} values are sought.

The absence of the biological content of the coefficients in the polynomial equations obtained can, to some extent complicate the interpretation of the proposed models. Nevertheless, it is expedient to use the method of calculation RGR_{UL} , NAR_{UL} , given in this article, for characterizing and modeling of production process (inflow and outflow of

assimilates from the upper donor leaves of plants), adaptive reactions of agricultural plants to environment factors.