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SIMULATION OF IRRIGATION EFFECTS ON WINTER WHEAT YIELDS.**Lebediev D.G., Gazyetov Ye.I., Medinets V.I., Pavlik T.V.***Odessa National I.I. Mechnikov University, Odessa, Ukraine*E-mail: lebedevdenis@gmail.com

Over the last years the problem of forecasting of climate changes' influence on agro-biocoenoses functioning and, respectively, on the yields of cultivated crops, is urgent for Ukraine, which is within the group of the countries-leaders in crops production. Winter wheat is the main cereal in Ukraine and, in particular, in Odessa Region. According to its climate conditions Odessa Region is within the zone of risky agriculture and irrigation has been developed there over the last decades. That is why use of mathematical models to determine optimal irrigation depth and forecast its effects on winter wheat yields is one of the most efficient instruments of agro-economic management.

Aim of the work was to study of effects of irrigation and amount of fertilizers applied on winter wheat yields for Odessa Region using the GEPIC (GIS-based Environmental Policy Integrated Climate) Model elaborated by Swiss Federal Institute of Water Sciences and Technologies (EAWAG).

Simulation methodology comprising use of input data set (rasters of elevations, slopes, climate etc.) has been described. As the result of the simulation massifs of output data are being formed (yields, required irrigation depth etc.)

Presented are the results of GEPIC Model validation for the season 2008-2009 for Odessa Region conditions, based on which selection and specification of the model main parameters have been performed. Analyses of results of the simulation performed at different irrigation and fertilization regimes have shown the following: under no irrigation and no fertilizers average yield for the region for the year 2009 made 21.1 centner/ha; under no irrigation and with application of fertilizers average yield for the region for the year 2009 made 24.1 centner/ha; under automatic selection of irrigation depth and no fertilizers average yield for the region for the year 2009 made 37.6 centner/ha; under automatic selection of irrigation depth and fertilizers application average yield for the region for the year 2009 made 53.3 centner/ha .

It has been shown that the simulated irrigation depth required for normal vegetation of winter wheat is within 400 to 480 mm ($4000 - 4800 \text{ m}^3 / \text{ha}$), which is the norm for winter wheat. Conclusions that under the conditions of Odessa Region irrigation influences winter wheat to higher extend than fertilizers has been grounded. Recommendations to use the GEPIC Model to forecast the yields of other crops have been considered.

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