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Average daily consumption of onion for drip irrigation in Southern Ukraine

The purpose. To evaluate potential productivity of agricultural lands on the basis of method of model simulation of conditions of water-land-use in view of probable climate fluctuations within the limits of Kahovsk and Chaplinsk areas of Kherson oblast for justification of restoration and development of irrgi ation in these terrains. **Methods.** Analytical, statistical, imitating (simulation), method of system analysis. **Results.** As a result of typification of the pilot terrain typological ranges with homogeneous soil-climatic conditions are allocated. Simulation of potential productivity of lands on each typological range is executed by means of dynamic model of production process WOFOST on an instance of corn. The assessment of productivity of lands is based on results of simulation of the built scripts of water-land-use with various natural-economic conditions. **Conclusions.** The method of simulation of scripts of water-land-use has allowed to note various factors of influence on formation of potential productivity of lands on an instance of corn for grain under different natural-economic conditions, and also to select economic and ecologically safety alternative of restoring irrigation. Bibliogr.: 12 titles.

Key words: *typification of terrain, simulation, potential yielding ability of corn, productivity of lands, scripts of waterland-use.*

Formulation of the problem. The basis of proper irrigation regime is cumulative water consumption (evapotranspiration) or amount of moisture that is spent on transpiration and evaporation from the soil. The problem of ground water regime - meet the needs of plants during the growing season for the formation of high yields in agrocenoses [7,8,9].The total water consumption depends on many factors, but most weather conditions, but because the definition of the total evaporation plants for biological factors meteorological indicators of the growing season is closest to the optimum level. At the same time the introduction of drip irrigation of vegetable crops calculation methods for determining total evaporation of moisture to control costs do not apply because they do not by biological or biophysical factors crops.Therefore of their determination and install dependencies by which to control evapotranspiration, for example, by G.K.L'gov for a minimum number of meteorological indicators is an urgent task.

State study of the problem. Regularities costing soil moisture for various productivity agrocenosis are fundamental principles for the development and improvement of irrigation regimes of agricultural crops. [4,5,11].One of the simplest methods of determining the total evaporation - settlement (S.M.Alpatyeva, D.A. Shtoyko, N.N. Ivanov, G.K.L'gov, Penmana-Monteith) for meteo data [1,3,10].One of the simplest methods of determining the total evaporation - settlement (S.M. Alpatyev, D.A.Shtoyko, N.N.Ivanov, G.K. L'gov, Penman-Monteith) for meteorological parameters [1,3,10].In content, it is a mathematical model to determine the total evaporation during wetting the entire surface of the soil.Because of the application of these methods of determining the total evaporation to form drip irrigation regimes is problematic, given the characteristics of the local contours evaporation of moisture.Their use is possible after clarifying the definition of coefficients on a comparative analysis of total values, average daily water consumption according to the experimental and calculated by methods.

Objectives and methods of research. Objectives was to study the biophysical the coefficients determining the onion and development of static models to approximate the average daily water consumption and biophysical factors under drip irrigation based on experimental data study modes of a drop irrigation of onion.Field research conducted at the vegetable of experimental Institute laboratory

areas of irrigated agriculture in 2007-2009. Research by the method of business in irrigated agriculture and vegetable growing [2,6].

Results. Research the average daily evaporation onion indicates that during the period growing season at different levels of humidity before watering there is the close communication with the sum of effective temperatures, which determine the mass of shoots from the date of the respective phase of growth and development.Thus, the amount of effective temperatures from 210 to 360 ^{0}C the average daily value of the same level for all variants of the experiment does not depend on the level of soil moisture before watering, and most likely the average daily water consumption is covered by soil moisture reserves.This balance of average costs moisture levels of soil moisture before watering retained only until the first of watering, then the value of the total evaporation hydrothermal conditions determined course of the year. Maximum daily water consumption there is in the dry 2007 - 73 m^3/ha regime soil moisture before watering least 90% of the moisture capacity of the soil. It should be noted that the heat factor is quite powerful agent of influence on the value the average daily evaporation.Thus, in 2007 the dry version with soil moisture before watering least 70% of the soil moisture capacity, average daily water consumption reached 57.9 m3 / ha per day, which is 0.2 m3 / ha higher than the maximum average daily spending in the medium to dry moisture - 2008 and the average wet - in 2009 a variant of irrigation before soil moisture levels - 90% of the smallest capacity (Fig.1).

Figure 1.Average daily evaporation of onion during the investigations, at different levels of soil moisture before watering.

Comparison of extreme functions approximating curves shows that for each level of evaporation soil moisture before watering occurs sum of effective temperatures – 2156,2 ^{0}C.The value of average daily evaporation decreases from 57,7 m^3/ha to 49,8 m^3/ha for reducing soil moisture the prewatering from 90 to 70% of the smallest capacity.Research communication value of the average amount of evaporation and allowed to determine the effective temperatures biophysical factors for onions and set that maximum daily average per unit costs of moisture at 10C for the observed accumulation of the sum of effective temperatures at 730.5 0 C, corresponding to the beginning of intensive growth puff device.Note that in this phase of growth and development,given the small area of puff apparatus, the intensity of average cost increases due to evaporation from the soil surface.Despite the fact that in the future water costs are rising significantly, the dynamics of biophysical coefficient demonstrates a pronounced feedback from increasing the amount of effective temperatures.Characteristically, in the temperature range of 1631,1-2156,2^{0}C biophysical coefficients get stability for all levels of soil moisture, but the absolute value for the moisture level of the soil before watering 90% of the lowest moisture capacity costs moisture at 1^{0}C 18,2% respectively higher than 70% (Fig. 2).

Figure 2.Biophysical coefficients onions for drip irrigation at different levels of soil moisture before watering.

Statistical modeling allowed us to obtain the equation approximationthat with ample degree of reliability (R^2=0,98) allows you to define biophysical coefficients, and accordingly, evapotranspirationthat is the basis for determining the optimal irrigation regime onion for drip irrigation.

Conclusions.The study of the average daily evaporation due to the amount of effective temperatures has established these values approximated dependencies to determine biophysical coefficients onions, which allows determining the value of the total evaporation for drip irrigation and on its basis to form a drop irrigation regime onion.

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