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ASSESSMENT OF THE DYNAMICS OF CHANGES IN TEMPERATURE AND HUMIDITY FACTORS OF PRODUCTIVITY, GROWTH AND DEVELOPMENT OF CROPS OVER THE AGRICULTURAL TERRITORY OF THE RUSSIAN FEDERATION

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The study was carried out for the period from 1961 to 2020 (60 years) for 27 reference meteorological stations of the state meteorological network located in regions with the most developed agricultural crop production. The analysis of the statistical structure and zonal distribution of temperature and humidity factors of productivity, growth and development of crops was carried out for June and July. These months most often coincide with such critical phases of ontogenesis as flowering, grain filling and maturation for the main agricultural crops. As a result of the study, it was found that there was a significant increase in the average and maximum daily temperatures in June and July for the period 1991-2020. The greatest increase in the average monthly temperature in June (within 0.9–1.3°C) was noted at the meteorological stations Astrakhan, Bryansk, Volgograd, Voronezh, Kazan, Krasnodar, Kursk, Kyzyl and Penza. In July, the average temperature increased by more than 1°C at most of the meteorological stations. The average monthly temperature increased by more than 1.5°C at the meteorological stations Bryansk, Velikiye Luki, Voronezh, Krasnodar, Kursk and Kyzyl. The average maximum daily air temperatures in June over the past thirty years have increased by more than 1°C at the meteorological stations Astrakhan, Volgograd, Krasnodar, Kyzyl, Penza and Saratov. An increase in the average maximum daily air by more than 1.5°C in July was noted at meteorological stations Bryansk, Voronezh, Krasnodar, Kursk, Kyzyl, Penza, Ryazan and Tambov. Changes in monthly precipitation over the past thirty years were multidirectional. A slight increase in the precipitation amount in June was noted in Kostroma, Nizhniy Novgorod, Rubtsovsk and Tambov, in July – in Astrakhan, Biysk, Krasnodar and Kyzyl. A decrease in the precipitation amount in July was noted at stations Volgograd (22%), Voronezh (20%), Kazan (11%), Kostroma (11%), Tambov (31%), Troitsk (24%) and Ufa (20%). Since the deviations of the 30-year average from the standard climatic norm is being described, the changes that have occurred can be very significant. In combination with a significant increase in the number of days with maximum air temperatures of 30–35°C, these changes can have a serious negative impact on crop yields.

Keywords: productivity factors, phases of ontogenesis, climatic norm, maximum daily air temperature, precipitation.