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ECOLOGICAL AND GEOGRAPHICAL PREREQUISITES FOR THE SPREAD OF WEST NILE FEVER IN RUSSIA

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M.V. Lomonosov Moscow State University,
Faculty of Geography, Department of Biogeography
Russia, 119991, Moscow, Leninskie Gory, 1
E-mail: svetlana_2304@list.ru, mironova.va@gmail.com

In this paper we consider the ecological and geographical prerequisites for the spread of West Nile fever (WNF) in Russia. We have analyzed WNF situation in the country, identified the regions with frequent registration of the disease, and estimated the contribution of geographical factors to its spread in the urban environment. We used the degree-day method to assess the climatic conditions suitability for the West Nile virus (WNV) transmission. The role of certain geographical factors was revealed by the method of maximum entropy for the territory of Volgograd city.

In the territory of active WNV circulation and frequent WNF cases, the sums of effective temperatures increase without the growth of season duration of effective infectivity of mosquitoes. This situation creates favorable conditions for the virus development. As the sum of temperatures increases, the virus circulates more efficiently. In the considered territory, there is also a further improvement in the conditions of WNV circulation due to the sums of effective temperatures growth.

Modeling the contribution that the natural and urban environment makes to the spread of WNF on example of Volgograd, allows us to determine the outskirts of the city, built up with private houses and located along the rivers, as the most possible places for infection caused by WNV. These areas contain a variety of habitats for the virus vectors, such as mosquitoes, and for the virus reservoirs, such as birds, which causes an active circulation of the pathogen.

Keywords: West Nile virus, favorable climate, natural and urban factors, MaxEnt, modeling.
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