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**Vector-Borne Diseases: Impact of Climate Change on Vectors and Rodent Reservoirs**
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# Epidemiology of West Nile infection in Volgograd, Russia, in relation to climate change and mosquito bionomics.

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**Background**. West Nile fever (WNF) is endemic disease in Southern Russia. Human clinical WNF cases were occasionally registered in Astrakhan Province from the sixties as well as the WNF virus findings in environmental samples took place. In 1999 there was the large outbreak of WNF in Southern Russia ( > 500 cases in Volgograd Province that is about 25 cases per 100,000 of population). In 2000-2003 the WNF incidence rate decreased steadily from 2 cases/100,000 to zero, but the new outbreak occured in 2007 (38 WNF cases).

**Methods.** The weather data were obtained by local daily observation in 1996-2007 and from the database of the International Research Institute for Climate Prediction. The entomological results were obtained during the own field studies in Volgograd Province in 2001-2007.

**Results.** The analysis of climatic dataset in Volgograd from 1900 showed that the years 1999 and 2007 were the hottest year. This was due to very mild "winter" (Dec-Mar) and hot third quarter (Jul-Sep). We hypothesized that the high temperature in winter supported the survival of overwintering mosquito vectors and the high temperature in third quarter facilitated the growth of virus in mosquitoes, as well as propagation of mosquitoes themselves. There are up to 15 potential WNF vectors in Volgorad, but only *Cx.pipiens* (both autogenous and anautogenous populations) and *Cx.modestus* are abundant in late summer, when a peak of WNF incidence is observed, both in urban and rural conditions. Only these species are naturally attracted to and feed on both humans and birds. When more then 20,000 mosquitoes were studied by RT-PCR, the RNA of pathogenic WN virus genovariant were found only in Culex mosquitoes with infection rate of about 0.04%. So these species may be considered as a potential WNF "bridge vector" between birds and humans as well as main vector in sylvatic avain cycle. Their abudnance in an epidemic season was higher in the years with mild winter and hot summer, so this phenomenon may serve as a connection link between a climate and WNF epidemiology.

**Conclusions**. These findings give some hints on the predisposing factors for WNF epidemic as well as the possibility of weather surveillance and prediction of WNF outbreaks in temperate climatic zones such as Southern Russia. Entomological studies stress the need of vector control, first of all, the control of Culex mosquitoes both in their breeding and resting sites indoor and outdoor.