Tamás Bakonyi	
Position:	Associate Professor
Institution:	Department of Microbiology and Infectious Diseases, Faculty of Veterinary Science, Szent István University
Contact:	E-mail: Bakonyi.Tamas@aotk.szie.hu Web: www.univet.hu

West Nile virus endemic in Hungary

The West Nile virus is a world-wide distributed flavivirus, which is the causative agent of the disease "West Nile fever". This disease is characterized by fever, meningitis and encephalitis. The natural hosts of the virus are typically wild birds. The virus is transmitted between susceptible hosts by blood-sucking insects, predominantly culicid mosquitoes (arbovirus). The virus is maintained in the nature by the wild bird – mosquito cycle, but incidental mammal hosts may also get infected. Clinical disease is usually observed in humans and in horses. Although most infections remain subclinical, neuroinvasive WNV strains may cause lethal encephalitis.

A WNV strain emerged in the USA in 1999, and within five years spread all over the North-American continent. Several studies were focused on the characterisation and modeling of the spread of the virus in the susceptible host populations.

In Hungary the first WNV cases were diagnosed in 2003. In 2004, an exotic, lineage 2 virus strain emerged in the South-eastern region of Hungary, and caused encephalitic cases in birds of prey. Within a few years the virus established itself in the region, and an explosive geographic spread was observed in 2008. Besides wild birds, lethal encephalitic cases were diagnosed in horses and in a sheep. Several human encephalitic illnesses were also reported. The virus was dispersed in all regions of Hungary, and was also spread to the Eastern parts of Austria. Subsequent outbreaks were diagnosed in the epidemic seasons of 2009 and 2010. In 2010 the lineage 2 strain also emerged in North-east Greece, with several human outbreaks and causalities.

Mathematical modeling might be a useful tool to estimate the risk of virus infections, and to predict epidemiological processes. In the case of WNV, several factors influence the extent and intensity of the seasonal epidemics. Besides climate and weather (temperature, humidity, and precipitation), the number and abundance of amplifying hosts, competent vectors, susceptible hosts, and suitable habitats should be taken into consideration. Human activity may also influence the spread of the agent.

Basic research is needed to identify the data collection methods and intensity, which could provide sufficient information for the reliable modeling of WNV epidemiological processes in Hungary.