

## Vector capacity traits of Swiss mosquitoes for West Nile virus

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### Key words

West Nile virus, vector capacity traits, host preference, vector competence, *Aedes japonicus*, *Culex pipiens*

### Aim of the study

West Nile virus (WNV) has spread in Southern and Eastern Europe over the last decade. As a basis for a risk assessment of WNV transmission under local condition in Switzerland, this study was initiated to determine (1) population dynamics, (2) host preferences, and (3) vector competence of Swiss mosquitoes.

### Material and methods

Mosquitoes were collected from ovitraps, breeding sites and CDC traps at natural and suburban locations on both sides of the Alpine crest over two years. Host preferences were assessed with horse- and chicken-baited traps, and by blood meal analysis from blood-fed mosquitoes collected at the Zürich Zoo. Vector competence for WNV was assessed in Swiss mosquitoes under a fluctuating 'mid-summer' temperature regime.

### Results and significance

A total of 122'841 mosquitoes of 21 taxa were collected, with *Culex pipiens*, *Aedes japonicus* and *Ae. vexans* being most abundant. A total of 385 blood-fed mosquitoes were sampled at the Zoo and 1081 females through animal-bait experiments under field conditions. *Culex pipiens* trapped with both horse- and chicken-baited traps, and *Ae. japonicus* collected only with horse-baited traps, were tested both positive for mammalian or avian blood in the Zoo. Field-collected mosquitoes were fed with blood spiked with the WNV strains "Italy" or "New York", and the presence of viral RNA was investigated in pools (n=5) of mosquito head/thorax and saliva by RT-qPCR after incubation under a fluctuating 'mid-summer' temperature regime. In contrast to *Aedes vexans*, saliva of *Ae. japonicus* and *Cx. pipiens* was tested positive for both viral strains. Significantly higher viral titers were observed in head/thorax of *Ae. japonicus* than in *Cx. pipiens* and after inoculation with WNV strain "New York" compared to strain "Italy". Our studies suggest *Cx. pipiens* but also the invasive *Ae. japonicus* as key vector candidates for WNV transmission in Switzerland.

### Publications, posters and presentations

Schönenberger, A.C. et al.: Host preferences of host-seeking and blood-fed Swiss mosquitoes. Medical and Veterinary Entomology (accepted). Wagner, S. et al.: Diversity and seasonal abundances of Swiss mosquitoes at suburban sites and in zones adjacent to wetland nature reserves (submitted). Wagner, S.; Mathis, A.: Laboratory colonization of *Aedes geniculatus* in Switzerland (submitted). Wagner, S. et al.: Vector competence of Swiss mosquitoes under a realistic climatic Swiss mid-summer regime (in preparation).

Wagner, S. et al.: *Vector capacity traits of Swiss mosquitoes for West Nile virus*. 73<sup>rd</sup> Annual Meeting of the Swiss Society for Microbiology, Lugano (29/05/2015); Seminar, Institute of Parasitology, University of Zürich (19/05/2015); Swiss Vector Entomology Group scientific meeting, Bern (07/03/2014); Seminar, Institute of Parasitology, University of Zürich, (19/11/2013); Swiss Systematics Society Day, Luzern (15/11/2013); Swiss Vector Entomology Group scientific meeting, Basel (08/03/2013); Swiss Society for Tropical Medicine and Parasitology annual meeting, Bern (11/12/2012).

Wagner, S. et al.: *Können Schweizer Stechmücken West Nil Viren übertragen?* Amt für Abfall, Wasser, Energie und Luft, Kanton Zürich (03/11/2014); Entomologische Gesellschaft Zürich (10/01/2014).

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