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Simultaneous and Sequential Co-Infections with West Nile Virus and Usutu Virus in Culex pipiens biotype molestus

Inhalt

The epidemiological and geographical co-circulation of West Nile virus (WNV) and Usutu virus (USUV) poses the risk of potential co-infection in mosquito vectors. To investigate possible effects of co-infections in mosquitoes on the transmission of both viruses, a laboratory colony of *Cx. pipiens* biotype *molestus* was co-infected with WNV lineage 2 and USUV Europe 3, either simultaneously or sequentially in intervals of 7 days. Fourteen days after the last infection, infection and transmission were assessed.
After simultaneous co-infection, WNV transmission was increased compared to mono-infection, while USUV transmission was significantly reduced. In addition, WNV viral loads in mosquito bodies were significantly increased in mosquitoes with a concurrent USUV infection.
Similar effects on WNV loads were found in case of a WNV infection following a previous USUV infection; however, no significant impact on vector competence for USUV or WNV was observed. Initial experiments with a USUV infection after a previous WNV infection show a possible negative impact on USUV infection, indicating that WNV can outcompete USUV in any type of co-infection. Furthermore, possible negative effects of virus infection on mosquito fitness during sequential coinfection were observed, based on survival rates and biting behavior.
Further experiments will provide additional insights into the dynamics of WNV and USUV co-infections in mosquitoes, enabling risk assessment for regions with co-circulation.

Keywords

West Nile virus, Usutu virus, co-infections, vector competence

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