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Urban microhabitats differentially affect West Nile and Usutu virus infection rates in mosquitoes

Inhalt

West Nile (WNV) and Usutu (USUV) viruses are both transmitted by Culex mosquitoes and can cause disease with differing pathologies in humans and birds. We have shown that urban land cover shapes WNV infection rates in mosquitoes, most likely driven by avian host community composition. It is unknown which factors drive USUV abundance and how this is influenced by WNV.

Here, we comparatively analysed WNV and USUV infection rates in mosquitoes at different urban microhabitats in Berlin over three seasons.

In total, 41,526 mosquitoes were trapped at seven study sites: a residential courtyard, a park-like residential area (RA), three cemeteries (C), a sponge city site, and a nature conservation area (N). Mosquitoes were morphologically identified and tested for WNV and USUV infection by qPCR. Genome sequencing is ongoing.

Minimum infection rates for WNV were 5.72, 3.00 and 3.43 and for USUV 1.54, 5.14 and 1.18 in 2023 to 2025. Consistent with our previous study, WNV infection rates were unevenly distributed at the sampling sites, with the lowest detection rate at N (up to 0.4 %) and highest at RA (up to 1.5 %) and C (up to 2.1 %). This was not observed for USUV which showed a more even abundance across sites.

Our study demonstrated extensive endemic circulation of WNV and USUV in Berlin. Notably, the two viruses exhibited distinct spatial and temporal abundance patterns, suggesting that different avian species may contribute to their amplification in urban environments.

Keywords

West Nile virus, Usutu virus, mosquito-borne virus, vector ecology, one health

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No, I am not a Junior Scientist.

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