ID der Kurzfassung : **301**

Plasticity in Thermal Tolerance, Vector Competence, and Metabolomic Responses of Culex pipiens under Seasonal and Microclimatic Variation

Inhalt

Due to global warming, vector-borne diseases are spreading worldwide. West Nile virus (WNV) outbreaks in Germany have increased since 2019, typically linked to hot summers. The main vector of WNV in Central Europe is the *Culex pipiens* species complex. While its role in transmission is well known, little is understood regarding how *Culex pipiens* responds physiologically and metabolically to heatwaves, raising questions about its climate resilience. We sampled six *Culex pipiens* populations along two urban-to-rural gradients in west and east Germany and across two seasons to assess survival and vector competence for WNV. To better understand their heat response, metabolomes of all populations were also analysed. Using random forest models, we evaluated the influence of biological factors (e.g. sex), climatic variables (micro- and macroclimate), and the experimental design (e.g. season) on heat survival and vector competence. Heat survival was affected by sex, age, season, and pre-oviposition microclimate, while vector competence was affected by season and especially the microclimate. Metabolomic profiling revealed differences between heat-treated and control individuals, as well as between populations, with the northernmost population possessing a distinct metabolic signature. These findings highlight the plasticity of thermal tolerance, metabolic response, and vector competence in *Culex pipiens*, with implications for WNV transmission under climate change.

Keywords

climate change, phenotypic plasticity, thermal adaptation, global change entomology

Registration ID

151

Professional Status of the Speaker

Postdoc

Junior Scientist Status

Yes, I am a Junior Scientist.

Track Klassifizierung: Vectors

Typ des Beitrags: Oral presentation