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# Mathematical modeling of mosquito borne diseases in Germany

## Inhalt

Usutu virus (USUV) has emerged as a public health concern in Europe, showing a rapid spread and impact on avian populations. We propose a mathematical model to characterize the transmission dynamics of USUV between Culex mosquitoes and European blackbirds. Our model incorporates mosquito population dynamics, driven by temperature, rainfall, and wind speed. We analyzed the model using mathematical techniques to gain insights into the dynamics of USUV transmission. Through sensitivity analysis, we investigated the influence of key parameters of the mosquito offspring number and the basic reproduction number, on the spread of the virus. We extend the model to include control measures targeting the mosquito population. Numerical simulations are conducted to assess the effectiveness of these control measures. By integrating epidemiological, ecological, and environmental factors, our model offers a comprehensive understanding of USUV transmission dynamics between mosquitoes and birds in Germany. The insights derived from this study can guide surveillance strategies, inform evidence-based public health policies, and aid in implementing targeted interventions to mitigate the impact of USUV on avian populations in Germany. In conclusion, this research provides a valuable tool for decision-makers to develop proactive strategies for the prevention and control of USUV, ultimately protecting public health and preserving the well-being of avian populations in Germany.

## Keywords

Flavivirus, reproduction number, offspring number, vector control

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## Professional Status of the Speaker

PhD Student

## Junior Scientist Status

Yes, I am a Junior Scientist.

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