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Association of land-use with genetic and morphological variability of the *Culex pipiens* complex in Germany

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Mosquitoes of the *Culex pipiens* complex are relevant vectors of West Nile Virus, which has been locally detected in Germany since 2018. Environmental changes, including land-use modifications and climate change, may influence genetic and morphometric traits of mosquito populations, potentially affecting their fitness and vector competence.

This study examines association between environmental factors (land-use, temperature, latitude), genetic variability, and wing characteristics (shape, centroid size) of *Culex pipiens* s.s. populations.

Up to 20 female mosquito specimens from 23 sites across Germany were used. Wing shape and size were assessed using landmark-based morphometric methods, and genetic variability was examined via mitochondrial COI gene sequencing. Wing shape showed weak associations with latitude and land-use types ($p < .05$, $R^2 < 2\%$), and tree cover had a minor effect on centroid size ($R^2 = 1.4\%$). Genetic variability was low ($\pi = 0.49$; $Hd = 0.15$). Haplotype analysis assigned 341 specimens to biotype *pipiens* and 8 to *molestus*. A negative Tajima's D (-2.05) indicated population expansion. No correlation was observed between wing shape and genetic variability.

The results indicate limited genetic variability of the *Culex pipiens* s.s. populations. Although associations between environmental factors and morphology were measured we conclude that these influences are minor and that *Culex pipiens* s.s. populations in Germany exhibit a highly stable population structure.

Keywords

Culex pipiens, vectors, land-use, variability-

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Graduate Student

Junior Scientist Status

No, I am not a Junior Scientist.

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