Tropentag, September 10-12, 2025, hybrid conference

"Reconcile land system changes
with planetary health"

The hidden link: How invasive flora fuels mosquito-borne disease transmission

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Abstract

Background

Invasive alien plant species pose significant ecological and public health risks, particularly in sub-Saharan Africa. Among these, *Parthenium hysterophorus* (*Asteraceae*) is a major concern due to its ability to alter ecosystems, reduce biodiversity, and disrupt agriculture. Climate change exacerbates these effects by modifying rainfall patterns and temperatures, creating favourable conditions for mosquito breeding. While mosquitoes rely on both blood meals and plant-derived sugars, the role of invasive plants in influencing vector populations and arboviral transmission remains unclear. This study investigates the impact of P. hysterophorus on mosquito abundance, species diversity, and arbovirus circulation in the Kenyan Rift Valley.

Methods

Mosquitoes were collected from six villages with varying levels of P. hysterophorus invasion—three heavily invaded and three free from the weed. A combination of trapping methods captured approximately 50,000 mosquitoes, which were identified using morphological and molecular techniques. Arboviral screening was performed using RT-PCR to detect dengue, chikungunya, and Rift Valley fever viruses. Mosquito abundance and diversity were compared between invaded and non-invaded areas.

Results

Mosquito abundance was significantly higher in P. hysterophorus-invaded areas, with increased densities of major arbovirus vectors, particularly Aedes and Culex species. Species diversity differed notably between sites, with a shift favouring disease vectors in invaded areas. This pattern suggests that P. hysterophorus invasion creates conditions that support higher mosquito densities and vector dominance, indicating a potential link between plant invasion and increased disease risk. Arboviral screening detected a higher prevalence of viral markers in mosquitoes from invaded sites, further supporting this association.

Conclusions

This study highlights how P. hysterophorus invasion may enhance mosquito vectorial capacity, influencing arbovirus transmission. Understanding these interactions is crucial for developing integrated vector management strategies that consider ecological and public health impacts.

Keywords: Arbovirus transmission, invasive alien species, mosquito, *Parthenium hysterophorus*, plant–vector interactions

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