

EVIL SIX THREATS TO BIODIVERSITY AS AN IMPORTANT DRIVER OF ARBOVIRAL DISEASES: ONE HEALTH APPROACH AS A PANACEA

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Content:

- ✓ Background — what are arboviruses?
- ✓ Major Arthropod Vectors of Arboviruses
- ✓ Evil Six Threats to Biodiversity:



Climate change, Overexploitation of natural resources, Land-use change, Invasive alien species, Pollution, and Nutrient loading

- ✓ Evil Six Threats and Transmission of Arboviruses
- ✓ Holistic Approaches to Health
- ✓ One Health as a Panacea for Arboviruses

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Background

- ✓ Arboviruses: Taxonomically diverse group of viruses like West Nile virus (WNV), Dengue virus, and Zika virus transmitted by arthropod vectors.
- ✓ Most undergo series of cycles including sylvatic, epizootic, and urban cycle for diseases transmission.
- ✓ Account for >700,000 deaths and 17% of all infectious diseases across the world.

Major Arthropod Vectors of Arboviruses

- ✓ Mosquitoes (Diptera: Culicidae), ticks, sandflies, and biting midges.

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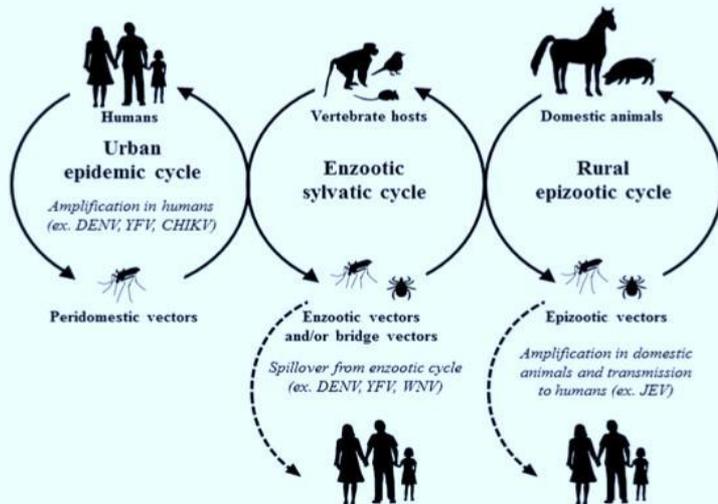


Figure 1 Transmission cycles of arboviruses

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Evil Six Threats and Transmission of Arboviruses:

- ✓ ***How is climate change related to the transmission of Arboviruses?***

- Vector competence, viral replication rate, and frequency for viraemic bloodmeal increases with increased temperature. Though, temperature is not a one-direction impact.

- EIP of WNV shortens with increase d temperature
- Affects fecundity, reproduction of arthropod vectors and frequency of contact with hosts.

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Evil Six Threats and Transmission of Arboviruses Cont'd

✓ *Overexploitation of natural resources and transmission of arboviruses*

- Susceptibility of vectors to infection by pathogen becomes higher from “dilution effect”
- Deforestation leads to habitat loss and facilitate arthropod-borne zoonotic diseases e.g. Kyasanur forest disease.
- Reduced biodiversity Increases vectors dispersion to new ecological niche and contact with hosts is facilitated e.g. sylvatic mosquito vectors.

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✓ *Pollution and transmission of arboviruses*

- Pollution of ditches and water body from human activities like oil exploration creates a suitable breeding sites for vectors
- High incidence of vector infestation in densely populated areas
- Unsanitary environment promotes emergence and reemergence of arboviral diseases/infections

✓ *Nutrient Loading & transmission of arboviruses*

- Stimulates planktonic algal growth that serves as food for mosquitoes vector
- Facilitates the growth of immature mosquitoes
- Rapid development and survival of immature and adult mosquitoes.

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✓ *Land-use change and transmission of arboviruses*

- Land-use change leads to disruption of biodiversity leading to vectors abundance in new areas
- Loss of arthropod vectors' habitat, the hosts and the pathogens
- Spillover of arboviruses are facilitated

✓ *Invasive alien species and transmission of arboviruses*

- High rates of reproduction, adaptation to synanthropic locations and different habitats
- Ability to thrive in various climatic regions

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Holistic Approaches to Health: One Health as a Panacea for Arboviruses

- ✓ One Health based research on arboviruses should be prioritized
- ✓ Interdisciplinary entomological surveillance should be strengthened
- ✓ Evil six threats to biodiversity should be monitored in regards to the spread of arboviruses
- ✓ Community involvement
- ✓ Government support.



Thanks for Listening!

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