



Transmission Routes and Possible Endogenization of Culicine-Associated Z Virus in *Aedes japonicus* Mosquitoes Located in Wooster, Ohio, USA

THE COLLEGE OF
WOOSTER

Jenna Rashid and Dr. Ferdinand Nanfack-Minkeu, Department of Biochemistry and Molecular Biology

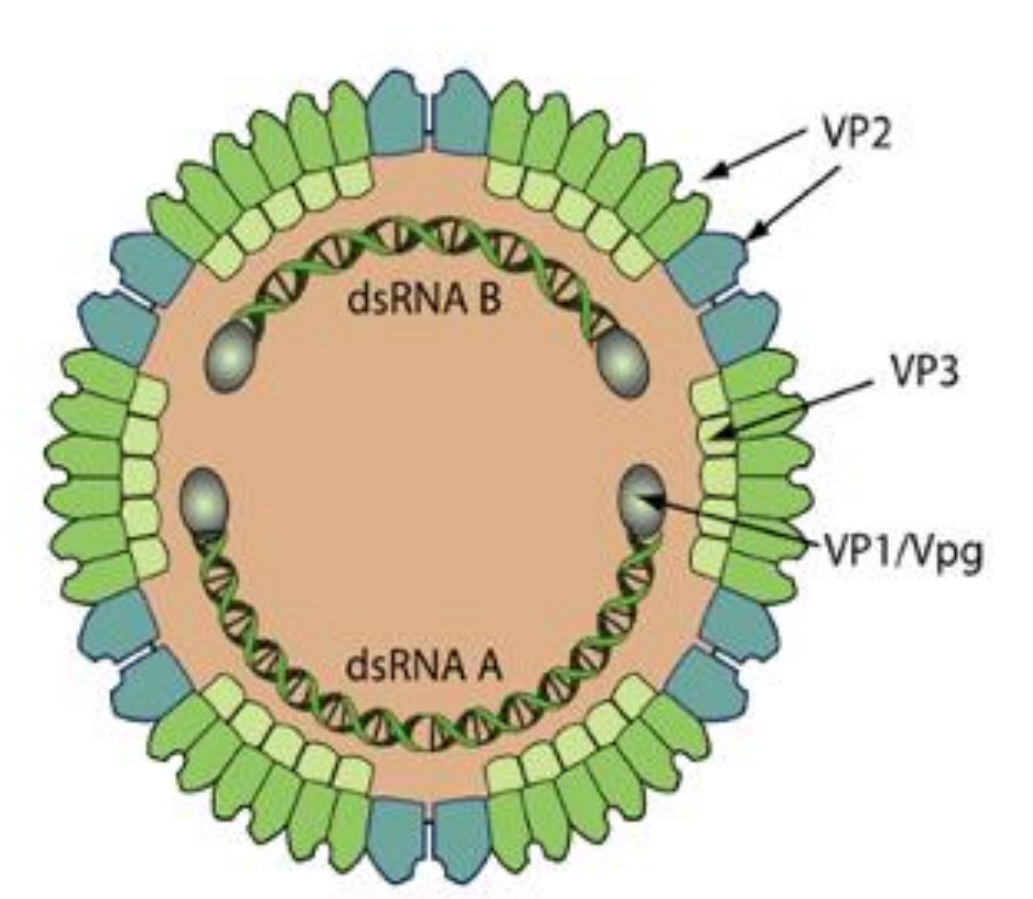
Introduction

- Insect-specific viruses
 - Restricted to arthropods^{1,2}
 - Vertically transmitted from parent to offspring
- Recent advances in genomics and sequencing technologies have enabled the discovery of several ISVs²
 - Non-retroviral integrated RNA sequences (NIRVS) do not encode for reverse transcriptase or integrase^{3,4}
- Culicine-Associated Z Virus (CAZV)
 - Belongs to the genus Entomobirnavirus within the Birnaviridae family^{5,6} – “Bi-segmented RNA virus”
- Significant gaps remain regarding CAZV’s prevalence, forms of the virus to explore viral integration, and potential transmission routes



(Walter Reed, 2024)

VIRION



(ViralZone, 2024)

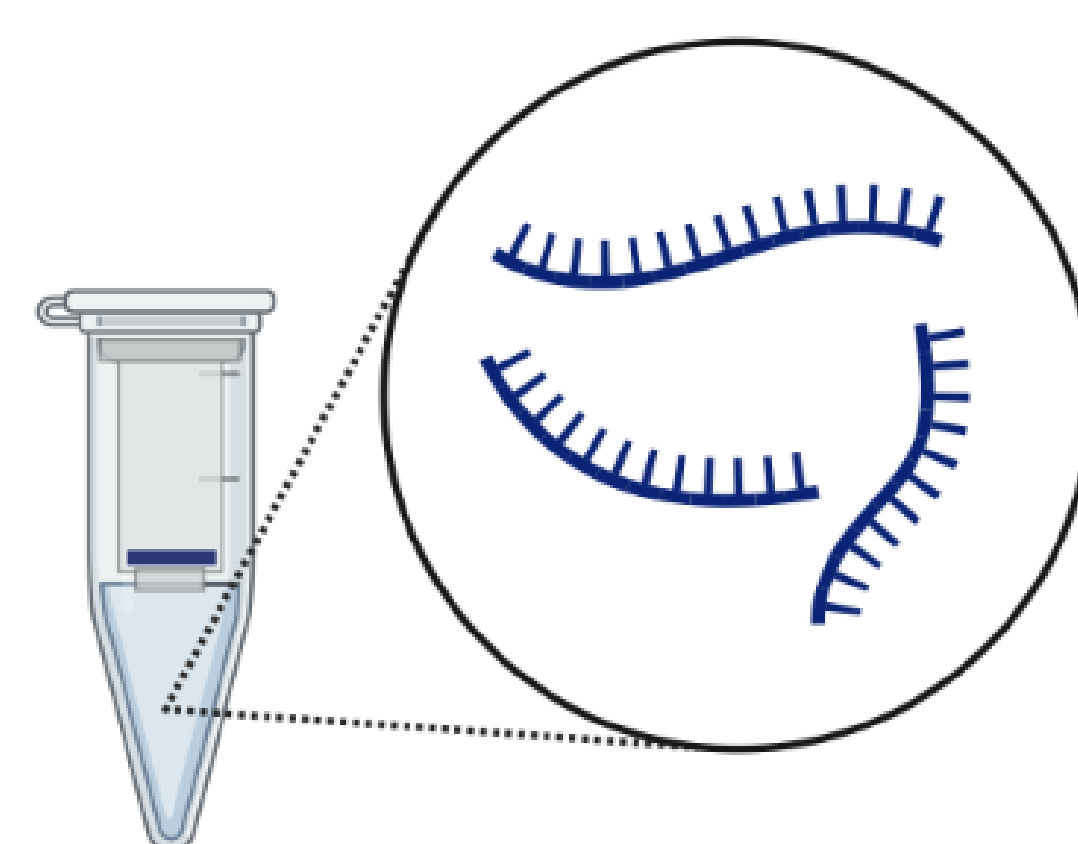


(Tesh et al., 2020)

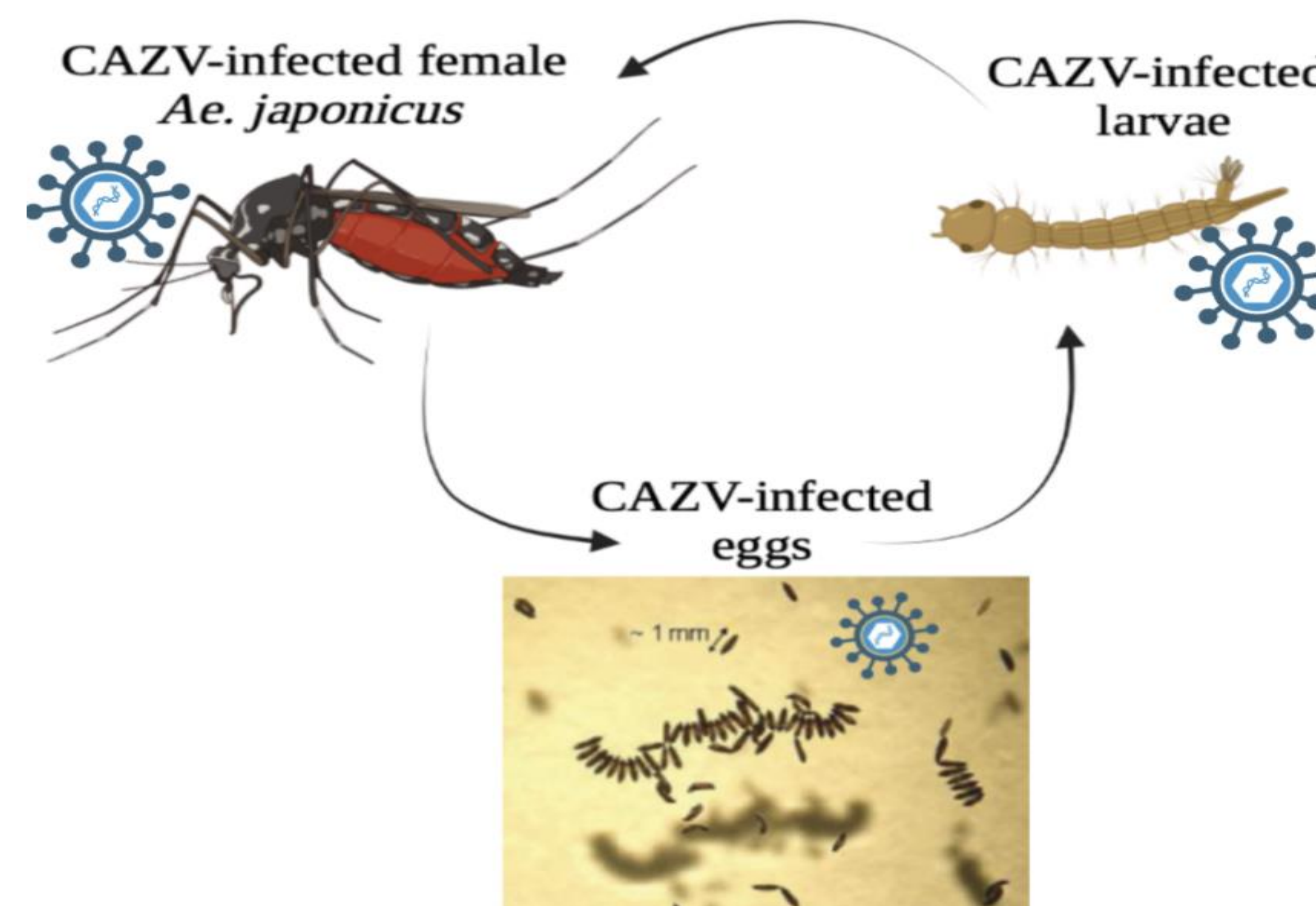
Hypothesis

- CAZV is highly prevalent in *Aedes japonicus* mosquitoes in Wooster, Ohio due to potential viral endogenization and vertical transmission as a key mode of persistence

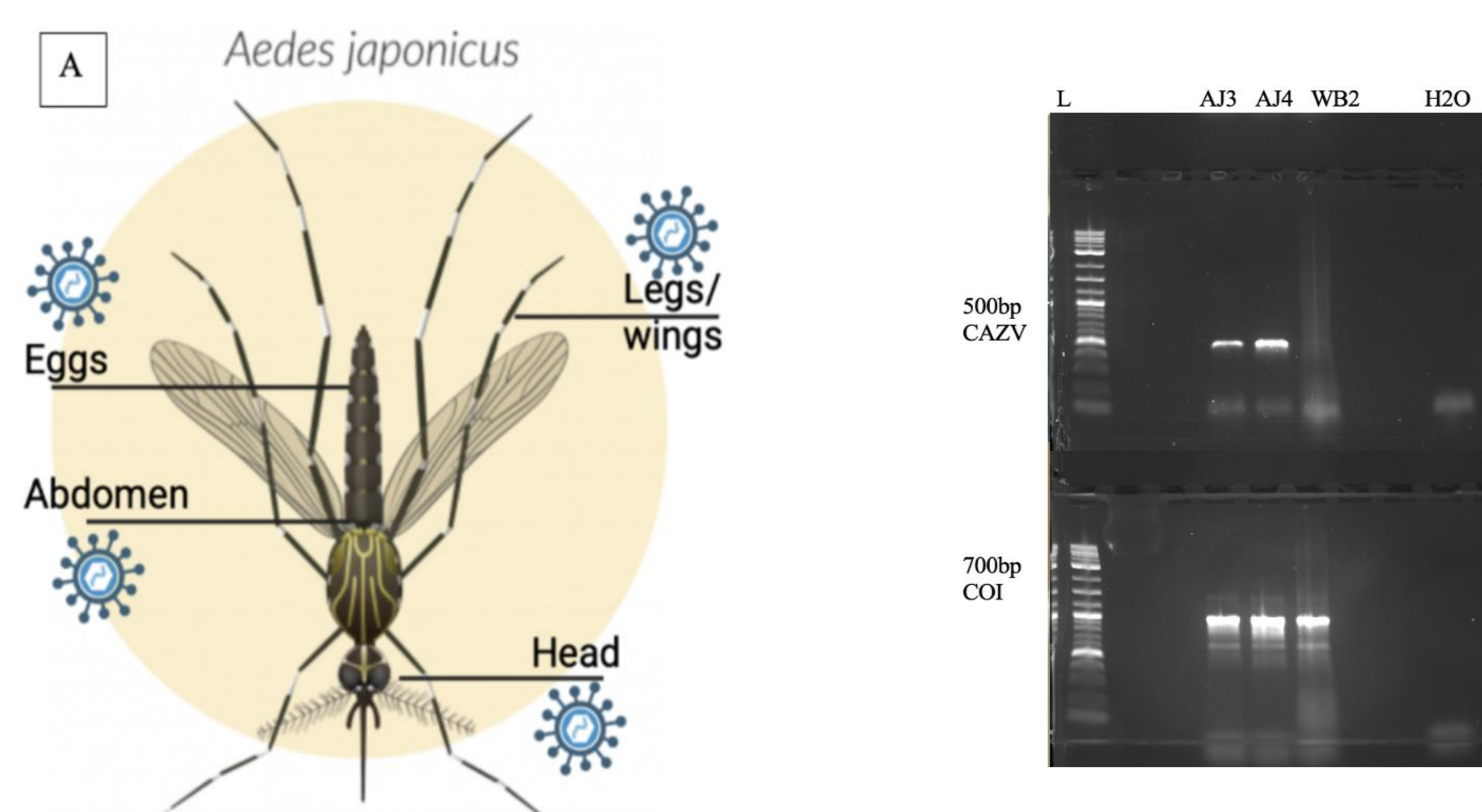
Methods



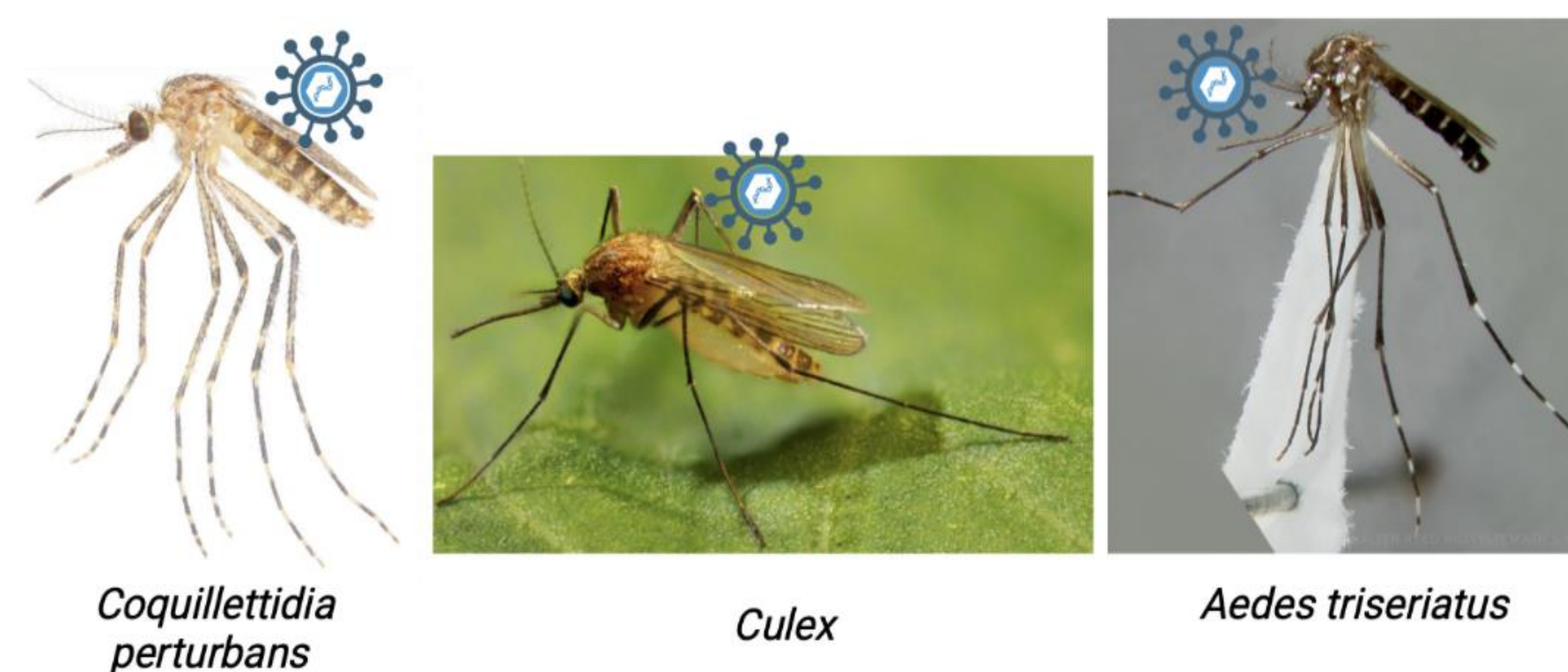
Vertical transmission of CAZV



Dissemination and Forms of CAZV



Host tropism of CAZV



Discussion

- We can combine the high prevalence rate of CAZV with the detection of CAZV across multiple developmental stages, such as egg and larval stages, proposing that transstadial transmission and routes of efficiently spreading the virus
- Our experiments support the idea of sexual transmission, mainly when we identified seminal fluid containing viral CAZV contamination.
- CAZV has a high capacity to disseminate throughout the mosquito's body rather than localizing in specific or primary tissues.
- AZT treatment results were not as effective as anticipated
- The genetic variability observed in CAZV hosts highlights its ability to adapt to environmental changes or conditions, enhancing CAZV's fitness and capacity to infect new hosts.

Future Work

- Better sequencing results to map polymorphisms
- Confirm endogenization of RNA viruses
- Use an inhibitor of integrase as opposed to an inhibitor of reverse transcriptase (AZT)
- Fluorescence in situ hybridization (FISH)

References

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