



Wolbachia-Infected Mosquitoes for Dengue Control

[Source: TH](#)

Why in News?

Dengue fever, chikungunya, and Zika virus represent major public health challenges in India, leading to considerable economic losses and healthcare burdens.

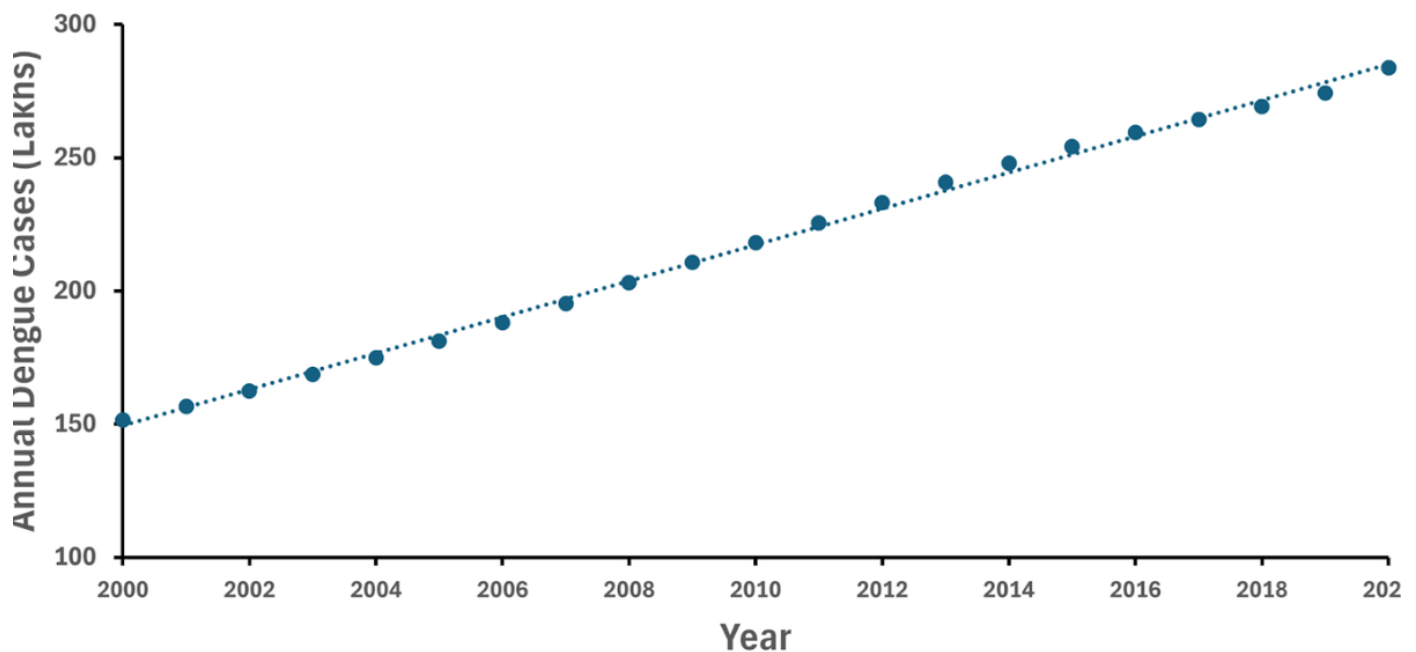
- The **limited success of traditional control methods** underscores the need for innovative strategies, such as the use of **Wolbachia-infected mosquitoes**, which offer a promising alternative.

Note:

- As of April 2024, **India recorded 19,447 dengue cases and 16 deaths**. Kerala had the highest number of cases, followed by Tamil Nadu.
 - In India, the **economic impact of dengue** is estimated at **Rs 28,300 crore** annually, alongside 5.68 lakh years of young life lost.
- Globally, the [World Health Organization \(WHO\)](#) has reported over **7.6 million cases** of dengue as of April 2024.

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Annual Estimated Dengue Cases in India (Year 2000-2020, Lakhs)



How does Wolbachia Help in Controlling Mosquito Populations?

▪ About:

- Wolbachia is a common type of bacteria found in insects. Approximately 6 in 10 of all insects, including butterflies, bees, and beetles, around the world have Wolbachia.

- Wolbachia bacteria cannot make people or animals (for example, fish, birds, pets) sick.

- They are **not found in Aedes Aegypti mosquitoes**.

- **Aedes aegypti can spread viruses including dengue, Zika, and chikungunya.**
- Aedes mosquitoes with **Wolbachia can be used to reduce the number of target mosquito species.**

- Mosquitoes with Wolbachia are **not [genetically modified](#)**.

▪ **Process of Production:** Wolbachia bacteria are first **introduced into the eggs of male and female Aedes Aegypti mosquitoes.**

- The eggs are then used to **mass-produce new mosquitoes infected with Wolbachia.**
 - There are **2 Wolbachia strains, wMel and wAlbB**, that have been transfected into **Aedes Aegypti** mosquitoes for population replacement.
- After production, the mosquitoes are **sorted by sex, with only the males being retained for release**, while the females are kept for further breeding in the laboratory.




▪ **Use for Mosquito Control:** **Wolbachia-infected mosquitoes** are used to **lower the population of target species** like **Aedes Aegypti**, the yellow fever mosquito, that can spread **dengue fever, chikungunya, Zika fever, Mayaro** etc.

- Control professionals release male **Aedes Aegypti** mosquitoes carrying **Wolbachia** into areas with wild **Aedes Aegypti**.
- When these **males mate with wild females that lack Wolbachia**, the **eggs produced do not hatch**. As a result, the population of **Aedes Aegypti** mosquitoes decreased.

▪ **Status of Wolbachia Programs in India:** India currently lacks an active **Wolbachia mosquito release program.**

- The **[Indian Council of Medical Research](#) - Vector Control Research Center (ICMR-VCRC)** has initiated the development of **wMel Aedes strains** but has faced delays in public updates and government approvals.
- Recent findings indicate the natural presence of Wolbachia in Aedes mosquitoes in Northeast India, **though its immediate significance is unknown.**

Most common mosquito-borne diseases

Mosquito	Type of Mosquito	Disease caused
	Aedes	Chikungunya Dengue Lymphatic filariasis Rift Valley fever Yellow Fever Zika
	Anopheles	Lymphatic filariasis Malaria
	Culex	Japanese encephalitis Lymphatic filariasis West Nile fever

Global Examples for Wolbachia Implementation

- In **Singapore**, the release of infected male mosquitoes **resulted in a 90% reduction in the Aedes population** and a 77% decrease in dengue cases in release areas.
- **Australia** adopted a population replacement strategy, leading to a stable **wMel strain** genome in wild populations and significant reductions in dengue incidence.
- A landmark randomised controlled trial in **Indonesia** demonstrated that areas with released wMel (strain) mosquitoes experienced **a 77% reduction in dengue cases and an 86% decrease in hospitalizations.**

UPSC Civil Services Examination, Previous Year Question

Q. Consider the following statements: (2017)

1. In tropical regions, Zika virus disease is transmitted by the same mosquito that transmits dengue.
2. Sexual transmission of Zika virus disease is possible.

Which of the statements given above is/are correct?

- (a) 1 only
- (b) 2 only
- (c) Both 1 and 2
- (d) Neither 1 nor 2

Ans: (c)

Q. 'Wolbachia method' is sometimes talked about with reference to which one of the following? (2023)

- (a) Controlling the viral diseases spread by mosquitoes
- (b) Converting crop residues into packing material
- (c) Producing biodegradable plastics
- (d) Producing biochar from thermo-chemical conversion of biomass

Ans: (a)

PDF Reference URL: <https://www.drishtiias.com/printpdf/wolbachia-infected-mosquitoes-for-dengue-control>

