

CORPORATE OFFICE

Delhi Office

706 Ground Floor Dr. Mukherjee
Nagar Near Batra Cinema Delhi -
110009

Noida Office

Basement C-32 Noida Sector-2
Uttar Pradesh 201301

CURRENT AFFAIRS

Date: 8 November 2023

WOLBACHIA

This article covers "Daily Current Affairs" and the topic details "Wolbachia". This topic has relevance in the Science and Technology section of the UPSC CSE exam.

For Prelims:

About Wolbachia?

For Mains:

GS 3: Science and Technology

About Global Impact of Dengue?

Why in the news?

The global rise in dengue cases remains a pressing issue. Researchers assert that the utilization of the Wolbachia Method can potentially reduce the transmission of dengue by a substantial 77%.

Introduction:

Wolbachia, a naturally occurring bacterium found in many insect species, including some mosquitoes, has become a powerful tool in the fight against mosquito-borne diseases like dengue, chikungunya, Zika, and yellow fever. This bacterium can inhibit viral infections in mosquitoes and has the potential to reduce disease transmission significantly. Here are the key points and developments related to Wolbachia and its role in combating dengue.

Wolbachia's Role in Disease Prevention:

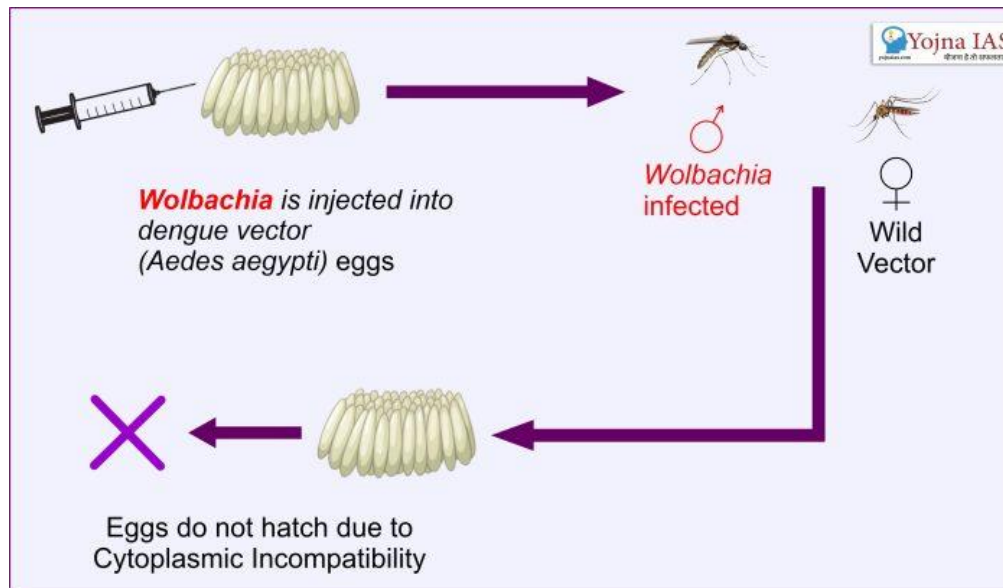
- The *Aedes aegypti* mosquito, responsible for transmitting diseases like dengue, chikungunya, Zika, and yellow fever, can be rendered incapable of transmitting these diseases when artificially infected with Wolbachia.
- Wolbachia inhibits viral infection by preventing the replication of the virus in the mosquito, reducing the number of infected mosquitoes in the population.

Population Replacement Strategy:

- Scientists have employed a method called the "Population Replacement Strategy." They infected some mosquitoes with Wolbachia and released them into affected areas.
- These Wolbachia-infected mosquitoes bred with local mosquitoes, gradually replacing the mosquito population in the area with those carrying Wolbachia.

Results and Impact:

- After 27 months of implementing the Population Replacement Strategy, researchers observed a 77% reduction in the incidence of dengue in areas where Wolbachia-infected mosquitoes were released, compared to areas without such deployments.
- Importantly, this approach is not limited to dengue and has the potential to block the transmission of other viruses present in mosquitoes.



Mass Production of Wolbachia-Infected Mosquitoes:

- Companies like InnovaFeed are exploring mass production of Wolbachia-infected mosquitoes as a sustainable way to control dengue and other mosquito-borne diseases.

Indian Council of Medical Research (ICMR) Project:

- ICMR has been working on a project to develop a strain of *Aedes aegypti* mosquitoes containing Wolbachia, known as the Puducherry Strain.
- This strain was developed in collaboration with Monash University in Australia and is a promising development in the fight against mosquito-borne diseases.

About Dengue:

- Dengue is a tropical disease caused by the dengue virus, primarily transmitted by *Aedes aegypti* mosquitoes.
- Common symptoms include fever, headache, joint and muscle pain, and a characteristic skin rash.
- There are four dengue virus strains, with Types II and IV considered more severe.

Global Impact of Dengue:

- Dengue has seen a significant increase in global incidence, with many cases going underreported, according to the World Health Organization (WHO).
- WHO estimates approximately 390 million dengue virus infections annually, with 96 million showing symptoms.

- In India, over 150,000 dengue cases are reported each year, as per the National Vector-Borne Disease Control Programme (NVBDCP).

Dengue Vaccine:

- The dengue vaccine CYD-TDV or Dengvaxia received approval from the US Food & Drug Administration in 2019, becoming the first dengue vaccine to gain regulatory approval in the US.
- Dengvaxia is a live, attenuated dengue virus vaccine intended for individuals aged 9 to 16 with laboratory-confirmed prior dengue infection living in endemic areas.

Conclusion:

The use of Wolbachia in controlling mosquito-borne diseases, particularly dengue, represents a promising approach with significant potential for reducing the global burden of these diseases. Mass production and ongoing research in this field hold the key to its future success in disease prevention.

Source:

<https://www.thehindu.com/sci-tech/science/wolbachia-an-unlikely-hero/article67500802.ece>

Q.1 The “Wolbachia method” is often discussed in the context of which of the following options? (2023)

- (a) Controlling the spread of viral diseases transmitted by mosquitoes
- (b) Converting agricultural residues into packaging materials
- (c) Producing environmentally friendly, biodegradable plastics
- (d) Generating biochar through the thermochemical conversion of biomass

ANSWER: A

Q.2 Regarding Wolbachia method, consider the following statements:

1. Wolbachia is a naturally occurring bacterium commonly found in numerous arthropods.
2. It is a genetic engineering process utilized to manage the spread of viral diseases by mosquitoes.

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

ANSWER: D

Rishabh