The World Mosquito Program, an Australia-based initiative, has made a pioneering breakthrough in the control of dengue fever. The researchers successfully utilized mosquitoes infected with a bacteria called Wolbachia to control dengue in Yogyakarta city, Indonesia. This achievement provides a promising step forward in preventing the spread of diseases transmitted by mosquitoes.

Understanding Wolbachia

Wolbachia is a natural bacterium present in up to 60% of insect species, including certain mosquitoes. Importantly, the bacterium is generally not found in the Aedes aegypti mosquito which is the main transmitter of human viruses like Zika, dengue, chikungunya and yellow fever. Wolbachia poses no harm to humans, animals or the environment.

Key Points

The Aedes aegypti mosquito spreads diseases like dengue, chikungunya, Zika and yellow fever. However, this is not possible when these mosquitoes are artificially infected with Wolbachia. The bacteria “inhibits” viral infection, implying that even if people get bitten by a mosquito, they will remain uninfected. This is facilitated as the bacterium does not allow the virus to replicate in the mosquito, thus limiting its presence within the mosquito’s body.

The Method Adopted and Its Results

The scientists selected a group of mosquitoes and infected them with Wolbachia. These mosquitoes were then released into the city where they bred with local mosquitoes. Soon, almost all mosquitoes in the area carried the Wolbachia bacteria- a strategy termed the Population Replacement Strategy. After 27 months, the researchers observed that dengue cases had dropped by a staggering 77% in areas where Wolbachia-infected mosquitoes had been introduced, compared to places without such interventions.

Mass Production and Other Developments

A French company, InnovaFeed, which produces insects for livestock feed, has partnered with the World Mosquito Program to develop the first industrial-level production of Dengue-controlling mosquitoes. The Indian Council of Medical Research (ICMR) has also embarked on a similar project, creating a strain of Aedes aegypti mosquito containing Wolbachia, known as the Puducherry Strain.

Dengue: An Increasing Global Concern

Dengue is a mosquito-borne disease caused by the dengue virus and primarily transmitted by the Aedes aegypti mosquitoes. It symptoms include fever, headache, muscle and joint pains, and a characteristic skin rash. The World Health Organization (WHO) reports that the incidence of dengue has dramatically increased globally in recent years. Most cases go under-reported, with WHO estimating 39 crore infections per year, out of which 9.6 crore show symptoms. In India alone, over 1 lakh cases were registered in 2018 and over 1.5 lakh in 2019.

Dengue Vaccine

The US Food & Drug Administration approved the first dengue vaccine, CYD-TDV or Dengvaxia, in 2019. It contains a live, attenuated dengue virus and needs to be administered to individuals aged between 9 and 16 who have had a previous laboratory-confirmed dengue infection and reside in endemic areas. It represents another significant step forward in combating this widespread disease.

