

Infect mosquitoes with Wolbachia, stop diseases

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Singapore: Scientists at Melbourne University and University of California have found that mosquito that are infected with the bacteria Wolbachia lose their ability to spread diseases such as dengue, yellow fever and malaria. However, the bacteria has been difficult to spread within the mosquito population because it reduces the mosquitoes' ability to lay viable eggs.

The research, which was conducted by Professor Ary Hoffmann from the University of Melbourne's Bio21 Institute and Department of Genetics and Professor Michale Turelli from the University of California, revealed that by introducing an insecticide resistance gene along with a newer strain of Wolbachia called wMelPop (which is a strong blocker of dengue and other viruses) into the mosquito, the insects passed on the disease-blocking bacteria to other mosquitoes faster. The results have been published in the journal Proceedings of the Royal Society B.

Professor Hoffmann said that, "Our results show that Wolbachia-based strategies could hold the key to a cheap and sustainable approach to disease control." Prof Hoffmann added that insecticide resistance genes would not spread to the uninfected mosquito populations because a Wolbachia-infected female with a resistance gene will always pass on both the gene and the bacteria to her offspring. Then, when an uninfected female mates with an infected male, the bacterium causes cytoplasmic incompatibility, which leads to the death of embryos.

Wolbachia bacteria strains live naturally inside up to 70 percent of all insects and are known to protect them against viral infection. The disease-blocking strain of Wolbachia was first discovered in Australian fruit flies in 1988 by Prof Hoffmann, and trials with collaborators at Monash and James Cook Universities in 2011 showed that Wolbachia-infected mosquitoes were unable to spread the dengue virus.

Insecticide use is very common in dengue and malaria-prone regions and so this strategy should select for the survival of only the Wolbachia-infected mosquitoes, but then these insects would be unable to pass on a virus to humans.