

Releasing mosquitoes to fight dengue: How Singapore took Project Wolbachia from lab to heartlands

Project Wolbachia, which started in 2016, uses specially bred male mosquitoes to suppress the *Aedes aegypti* population and reduce the risk of dengue.



An NEA field officer releasing male Wolbachia-Aedes mosquitoes at an HDB block. (File photo: NEA)

Releasing mosquitoes to fight dengue may sound counterintuitive, but Singapore has spent more than a decade developing the approach to tackle the problem.

Project Wolbachia, [which started in 2016](#), uses specially bred male mosquitoes to suppress the *Aedes aegypti* population and reduce the risk of dengue.

The project followed years of laboratory research and risk assessments, spurred in part by one of Singapore's worst dengue outbreaks in 2013, when more than 22,000 cases were reported.

The high number of cases gave researchers added impetus to look for new ways to control the mosquito population, Dr Chong Chee-Seng, director of environmental epidemiology and toxicology at the Environmental Health Institute, told CNA.

"That really spurred us in terms of research," said Dr Chong, who has since helped take Project Wolbachia from the laboratory to housing estates across the island.

WINNING PUBLIC ACCEPTANCE

But when researchers first began exploring the use of Wolbachia, there was no guarantee the idea would take off.

For years, the message from authorities has been to prevent mosquitoes from breeding, making the idea of deliberately releasing them into residential areas a potentially difficult one to sell, said Dr Chong.

"The only question is – if we release mosquitoes, can people accept it?"

Researchers were considering a number of technologies at the time, but Wolbachia caught their attention because it is naturally present in many insects.

The bacterium is found in more than 60 per cent of insect species, including butterflies, Dr Chong said.

“We thought Wolbachia is something that we should explore, and hence we started the laboratory assessment.”

Under the project, male *Aedes aegypti* mosquitoes carrying Wolbachia are released to mate with females in the wild.

Their resulting eggs do not hatch, suppressing the mosquito population over time.

Only males are released, and they do not bite – a fact that became central to explaining the project to residents.

“So our key message, what we are educating people, is that male mosquitoes don’t bite,” Dr Chong said, adding that this was important in helping people accept the releases.



BREEDING MOSQUITOES AT SCALE

Before reaching housing estates, the mosquitoes begin life as tiny specks of eggs at a production facility. The eggs are hatched in water, where tiny larvae emerge.

“Subsequently, they will turn into pupae. From this, that's where we can sort the males from females,” said Dr Chong.

While males are needed for releases, females also play an important role in keeping production going.

Adult males and females are kept together in cages to produce the eggs needed for the next generation, starting the process again. The cycle takes about a week.

A decade into the project, Dr Chong shared that the results at release sites have been significant.

“Currently in our release sites, we've seen for our *Aedes aegypti* population - it has dropped by 80 to 90 per cent and that also correspondingly translates to about 70 per cent reduction in dengue risks in those locations that have releases,” he added

“We are really appreciative that the residents are very supportive. We hope that more people will understand this project.”

Yet its success does not replace the role residents play in keeping dengue at bay, said Dr Chong.

While *Wolbachia*-carrying mosquitoes can help suppress the *Aedes aegypti* population, they cannot eliminate the places where mosquitoes breed.

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