





National Institutes of Health

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2946175/>

Sacramento-Yolo Mosquito Control District

<https://www.fightthebite.net/education/sit/>

Debug Fresno

<https://cmad.maps.arcgis.com/apps/MapJournal/index.html?appid=f90115bcf15943928fc82a79af89d71e>

IAEA

<https://nucleus.iaea.org/sites/naipc/dirsit/Pages/SIT-for-mosquitoes-FAQ.aspx>

## Wolbachia FAQ

### What is Wolbachia?

*Wolbachia* (wohl-bach-ee-uh) is a common type of bacteria found in insects. Approximately 6 in 10 of all types of insects, including butterflies, bees, and beetles, around the world have *Wolbachia*. *Wolbachia* bacteria cannot make people or non-target animals (for example, fish, birds, pets) sick.

More information about Wolbachia:

<https://www.cdc.gov/mosquitoes/mosquito-control/community/sit/wolbachia.html>

### How does Wolbachia help control invasive mosquitoes?

When male *Ae. aegypti* mosquitoes with *Wolbachia* mate with wild female mosquitoes that do not have *Wolbachia*, the eggs will not hatch. Non-biting male mosquitoes with *Wolbachia* are released regularly into an area by mosquito control professionals. Male mosquitoes with *Wolbachia* mate with wild female mosquitoes. Because the eggs don't hatch, the number of *Ae. aegypti* mosquitoes decreases.

### Is Wolbachia harmful to people or other animals?

*Wolbachia* are safe for humans and the environment. Independent risk analyses indicate that the release of *Wolbachia*-infected mosquitoes poses negligible risk to humans and the environment.

More information about Wolbachia:

<https://www.cdc.gov/mosquitoes/mosquito-control/community/sit/wolbachia.html>

<https://debug.com/how/>

### **Will this method help decrease disease outbreaks?**

Releasing mosquitoes with *Wolbachia* is not intended to stop a disease outbreak. However, releasing these types of mosquitoes over several months can reduce the number of a specific mosquito species, such as the invasive Aedes mosquito which can transmit diseases.

### **What can I do as a resident to help OCMVCD to help combat this invasive species?**

Mosquito control is a shared responsibility. Everyone must take charge of their yard and eliminate standing water and unneeded containers weekly. Residents can sign up to become a mosquito advocate in their neighborhood to educate their community:

<https://www.ocvector.org/become-a-neighborhood-advocate>

### **Where can I find more information from other organizations?**

Centers for Disease Control

<https://www.cdc.gov/mosquitoes/mosquito-control/community/sit/genetically-modified-mosquitoes.html>

World Health Organization

[https://www.who.int/news/item/14-11-2019-mosquito-sterilization-offers-new-opportunity-to-control-chikungunya-dengue-and-zika#:~:text=The%20Sterile%20Insect%20Technique%20\(SIT,with%20females%20in%20the%20wild.](https://www.who.int/news/item/14-11-2019-mosquito-sterilization-offers-new-opportunity-to-control-chikungunya-dengue-and-zika#:~:text=The%20Sterile%20Insect%20Technique%20(SIT,with%20females%20in%20the%20wild.)

National Institutes of Health

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2946175/>

Sacramento-Yolo Mosquito Control District

<https://www.fightthebite.net/education/sit/>

Debug Fresno

<https://cmad.maps.arcgis.com/apps/MapJournal/index.html?appid=f90115bcf15943928fc82a79af89d71e>

IAEA

<https://nucleus.iaea.org/sites/naipc/dirsit/Pages/SIT-for-mosquitoes-FAQ.aspx>

## **Irradiation FAQ**

### **What is irradiation?**

Irradiation, such as with gamma rays and X-rays, is used to sterilize mass-reared insects so that, while they remain sexually competitive, they cannot produce offspring. SIT does not involve transgenic (genetic engineering) processes.

### **What is the process of irradiation?**

Large numbers of mosquitoes are raised in a lab. Male mosquito pupae are separated from female pupae. Males are irradiated, using ionizing radiation, to make them sterile. Male mosquitoes are bred and sterilized using the same radiation found in x-rays. Males are then regularly released to mate with wild females. The resulting eggs will not hatch.

### **Is it harmful to humans or other animals?**

[Irradiated mosquitoes](#) cannot make people or animals (for example, fish, birds, pets) sick.

### **Will this method help decrease disease outbreaks?**

Releasing males that are irradiated is not intended to stop an outbreak. However, releasing these types of mosquitoes over several months can reduce the number of a specific mosquito species, such as the invasive Aedes mosquito which can transmit diseases.

### **What can I do as a resident to help OCMVCD to help combat this invasive species?**

Mosquito control is a shared responsibility. Everyone must take charge of their yard and eliminate standing water and unneeded containers weekly. Residents can sign up to become a mosquito advocate in their neighborhood to educate their community:

<https://www.ocvector.org/become-a-neighborhood-advocate>

## Where can I find more information from other organizations?

Centers for Disease Control

<https://www.cdc.gov/mosquitoes/mosquito-control/community/sit/genetically-modified-mosquitoes.html>

World Health Organization

[https://www.who.int/news/item/14-11-2019-mosquito-sterilization-offers-new-opportunity-to-control-chikungunya-dengue-and-zika#:~:text=The%20Sterile%20Insect%20Technique%20\(SIT,with%20females%20in%20the%20wild.](https://www.who.int/news/item/14-11-2019-mosquito-sterilization-offers-new-opportunity-to-control-chikungunya-dengue-and-zika#:~:text=The%20Sterile%20Insect%20Technique%20(SIT,with%20females%20in%20the%20wild.)

National Institutes of Health

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2946175/>

Sacramento-Yolo Mosquito Control District

<https://www.fightthebite.net/education/sit/>

Debug Fresno

<https://cmad.maps.arcgis.com/apps/MapJournal/index.html?appid=f90115bcf15943928fc82a79af89d71e>

IAEA

<https://nucleus.iaea.org/sites/naipc/dirsit/Pages/SIT-for-mosquitoes-FAQ.aspx>

## GM Mosquitoes FAQ

### What is a GM Mosquito?

[GM mosquitoes](#) are mosquitoes that have been implanted with a gene which was not originally present or naturally occurring in the insect. In one case, the implant in question is a self-limiting gene that disrupts the normal processes of mosquitoes' offspring. These offspring will, in turn, not survive to adulthood. These lab-grown *Aedes aegypti* mosquitoes would be released into the wild to mate with the wild population – where their offspring's inability to grow to adulthood would lower the population of mosquitoes. These are also often referred to as transgenic mosquitoes.

### How are they Genetically Modified?

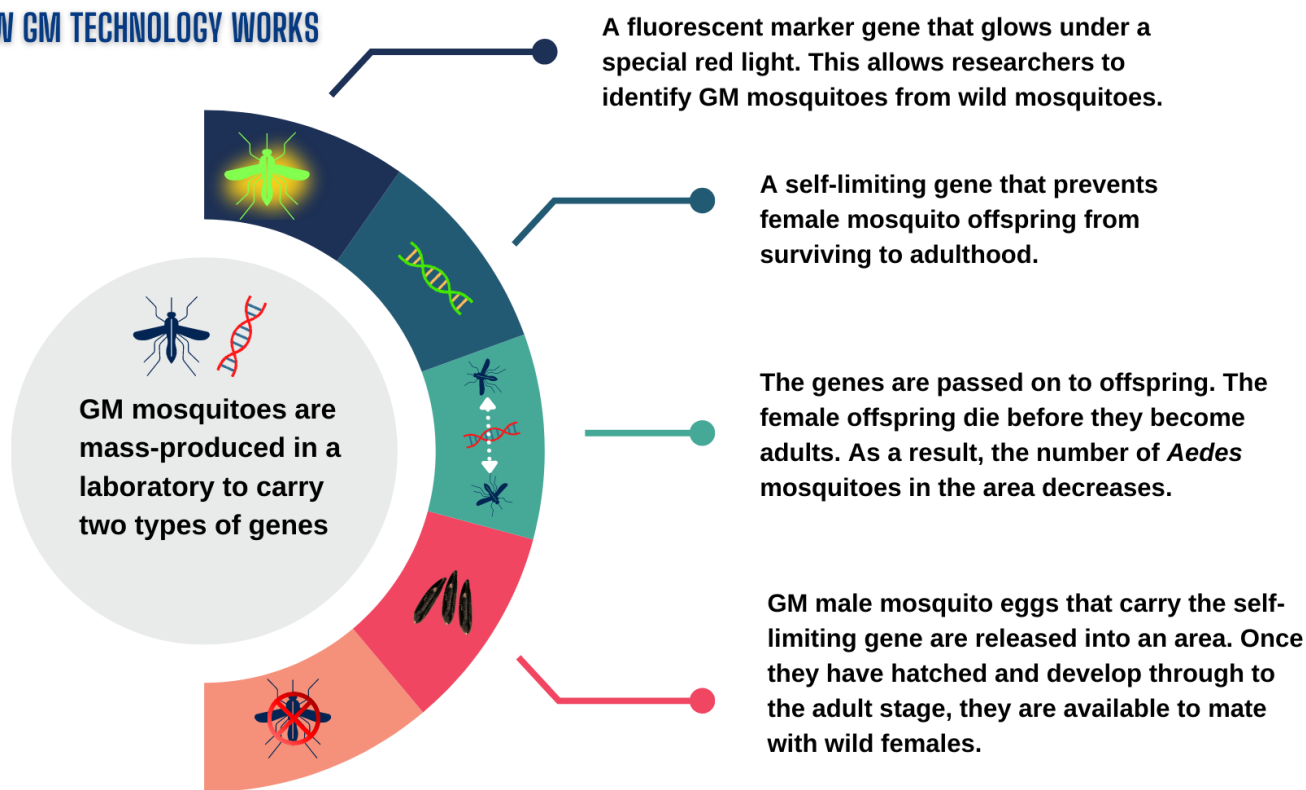
GM mosquitoes are mass-produced in a laboratory to carry three types of genes:

- A **fluorescent marker gene** that glows under a special red light. This allows researchers to identify GM mosquitoes from wild mosquitoes.

- A **self-limiting gene** that prevents female mosquito offspring from surviving to adulthood.
- A **male-selecting gene** that allows males to pass on their genes in a wild population for multiple generations, while the females never become adults.

GM male mosquito eggs that carry the self-limiting gene are released into an area. Once they have hatched and develop through to the adult stage, they are available to mate with wild females. The genes are passed on to offspring. The female offspring die before they become adults. As a result, the number of *Ae. aegypti* mosquitoes in the area decreases.

## HOW GM TECHNOLOGY WORKS



### Is it healthy for the environment to release GM mosquitoes?

The U.S. EPA, State of California have confirmed there is no adverse effect on humans or wildlife from implementing the SIT process.

For more information, see [EPA's Human Health Risk Assessment](#)

### Is using GM mosquitoes effective?

Using GM mosquitoes may be more effective if used along with other mosquito control methods as part of an [integrated mosquito management \(IMM\) approach](#), including:





<https://cmad.maps.arcgis.com/apps/MapJournal/index.html?appid=f90115bcf15943928fc82a79af89d71e>

IAEA

<https://nucleus.iaea.org/sites/naipc/dirsit/Pages/SIT-for-mosquitoes-FAQ.aspx>