



# Invasive Mosquito Species in California: A Growing Challenge

California has been severely impacted by the arrival of two problematic mosquito species. *Aedes albopictus* was discovered in 2011 in Los Angeles County and *Aedes aegypti* was detected in the cities of Madera, Clovis, and San Mateo in 2013. These mosquitoes have continued to spread, with *Aedes aegypti* now established in 12 counties in the Central Valley and Southern California. They pose a unique challenge to vector control agencies and a potential threat to the health of California residents and visitors.

## A PATHWAY FOR PATHOGENS

Invasive *Aedes* mosquitoes are vectors of Zika, dengue, chikungunya, and yellow fever viruses. With thousands of international travelers arriving or returning to California each year from areas where these viruses regularly occur, the potential for local transmission of imported diseases in the state is increasing. The arrival of a single traveler with an active infection into an area with invasive mosquitoes opens the door for these diseases to be spread here at home.

## A COSTLY ARRIVAL

In addition to the disease risk, invasive mosquitoes are a terrible nuisance. The females will bite throughout the day, resulting in numerous irritating bites, and will follow people indoors. As a result, many local vector control agencies have seen their requests for service double. These mosquitoes require unique surveillance and control methods which put a significant burden on local vector control agencies. For example, a Southern California district's operational expenses increased by 34% to deal with these invasive mosquitoes. All agencies with invasive *Aedes* detections have had to increase staff, equipment, traps, and develop additional outreach efforts and materials.

## THE NEED FOR NEW SOLUTIONS

Traditional vector control techniques have limited effectiveness against these invasive mosquitoes. Their ability to exploit small, often cryptic, water sources to develop their offspring makes reducing local populations a time-consuming and labor-intensive task.

This challenge has caused vector control agencies to seek innovative solutions to reduce or eliminate this new threat. Some have used intensive outreach campaigns (media and door-to-door) promoting resident-driven mosquito source prevention and elimination in the hope of establishing long-term control through behavior change. Others are refining techniques for wide-area larval control from air and ground vehicles, which have shown some initial success but are costly and difficult to sustain. In an ongoing project by Verily Life Sciences, MosquitoMate, and Consolidated Mosquito Abatement District in Fresno County, male *Aedes aegypti* mosquitoes carrying a naturally-occurring bacterium called *Wolbachia* are released to mate with the biting female mosquitoes. Male mosquitoes cannot bite and resulting eggs will not hatch. Recent results have shown a significant (95%) reduction in female *Aedes aegypti* numbers in areas where males were released.

While these techniques show promise, effective use will require wide-scale, multi-agency implementation throughout regions of the state, which may be difficult or impossible for local agencies to achieve alone. Understanding how these mosquitoes invade and thrive in California, as well as research, development, and implementation of new prevention and control strategies, will allow us to respond to the threat from invasive mosquitoes. Across the state, local agencies and their academic and private industry partners are working towards new solutions. State support and investment are vital to the success of these efforts.