Update on Oxitec's Proposed Pilot Project in California

We wanted to provide you with an update about Oxitec's efforts to come to California. The public comment period in the Federal Register closed on September 30 and the EPA is reviewing and responding to comments. There were 12,961 comments submitted, the majority of which were form letters. There were positive comments from prominent individuals and organizations including the National Association of County and City Health Officials (NACCHO), Marian Wilson Butterfly Garden, American Mosquito Control Association, Entomological Society of America, Society for Vector Ecology, Biotechnology Innovation Organization, the Reason Foundation and more.

The EPA did not make the initial PRIA deadline of November 7. Once we have a more definitive date, we will let you know. If the EPA approves Oxitec's amendment to the Experimental Use Permit (EUP), the company will seek approval from the California Department of Pesticide Regulation.

Oxitec has been working to determine which potential locations in California would be best for a pilot project. This included evaluating the numbers of *Aedes aegypti* in various communities and the interest/resource capacity of local mosquito control agencies to partner. After a thorough analysis, Oxitec determined that it would work to initiate a pilot project in the Central Valley. Oxitec has been working with Delta Mosquito and Vector Control District in Visalia, whose board of trustees voted unanimously to partner with Oxitec once it receives federal and state regulatory approval.

In addition to the factsheet and FAQ about Oxitec's technology we have created a myth v fact to counter the misinformation being spread. This document is posted on the member resources section of the MVCAC website and may be helpful in addressing questions or false information from residents, stakeholders, or elected officials.

Oxitec's pilot project in Florida is still underway and the Friendly™ *Aedes aegypti* mosquitoes are emerging, flying, and mating with invasive pest females as expected. They are producing offspring, and no offspring are female. We will share data from that project as it becomes available.

Lastly, PBS News Hour did an in-depth story on mosquito control and featured Oxitec's pilot project in the Florida Keys. There has also been a significant amount of media coverage about the spread of invasive *Aedes aegypti* in California - we have included a few articles below.

These mosquitoes 'prefer to bite people.' Meet the invasive insect ravaging the West Coast

Jordan Mendoza
USA TODAY
Oct. 14, 2021

Horror movies like "Jaws" "Anaconda" and "The Birds" became cult classics with the ability to show how scary animals can be when around humans. And while those larger animals can stir fear in the real world, there are plenty of tiny creatures to also generate nightmares.

Meet the invasive Aedes mosquito, an insect that really wants to bite you.

Originally from Asia, the Aedes mosquito is thought to have made its way to California from a shipment of bamboo from China in 2001, according to the Los Angeles Times. Now, the population of the mosquito has grown so rapidly that numerous counties in the state are trying to control the population rather than eradicate it.

But what makes these mosquitoes so much more terrifying than others? Their preference for biting humans.

Levy Sun, director of communications for the San Gabriel Valley Mosquito & Vector Control District, said most mosquitoes prefer to feed on birds, but with Aedes mosquitoes, it's a whole difference interest.

"With these Aedes mosquitoes, they don't care about birds or other mammals, they prefer to bite people," Sun told USA TODAY. "They'll continuously try and bite you over the course of a few minutes to get a full blood meal. So when you get five bites in your legs, it could very well be from just one Aedes mosquito."

The differences from other mosquitoes don't end there either. Aedes mosquitoes tend to be more aggressive, bite during the day and can live outdoors and indoors. They also tend to be more active during the fall, unlike other mosquitoes, which typically stop activity by October.

Luz Maria Robles, public information officer for the Sacramento-Yolo Mosquito & Vector Control District, said they even found these mosquitoes living in May this year.

"We just didn't realize that we were gonna find them so early," she said. "The season for this mosquito is kind of extending."

Another big danger of Aedes mosquitoes: viruses. West Nile virus is the most known virus mosquitoes can carry, but these critters can carry a lot more, such as Zika, yellow fever, dengue and chikungunya, among others. According to Sun's agency, the mosquitoes were responsible for Zika outbreaks in Florida, Texas, Hawaii and Puerto Rico.

So far, the mosquitoes have been found in 310 cities across 22 counties in California, according to state data, as well as in Utah. Data from the Centers for Disease Control and Prevention in 2017 estimated the mosquitoes were present in nearly all southwest and southeast states.

Robles said what makes it so hard to contain the mosquitoes is how they breed. Typically, mosquitoes lay their eggs in large bodies of standing water, whereas Aedes eggs "look like a very small speck of dirt," and the insects can lay them in a bottle cap of water and on things such as toys, buckets and plants.

"The eggs can survive in the dry form for many months, so that's also very difficult," she said.

Sun added another reason Aedes mosquitoes have thrived is that they have "taken advantage" of people creating conditions for them to survive. They don't fly far, meaning they usually go from yard to yard.

"These mosquitoes come from tropical climates, and by us here in Southern California creating microclimates in our yard, we allow these mosquitoes to thrive," he said. "You primarily find them in urban environments in cities."

One way to get rid of the mosquitoes is to have more native plants and vegetation in your area and get rid of all stagnant water — even in drink containers as well as communicating with neighbors about doing the same thing.

"You definitely have to do your part as a resident," Robles said.

Sun added doing those things is a much better solution than just using pesticides.

"Compared to the native mosquitoes here, they can actually be more resistant to a lot of the pesticides we put out in our yard," he said. "Our fear is that the resistance will be built up enough where it's not as effective."

As for protecting your body, repellent is the best way to go, as well as covering up the body as much as possible, Luz and Sun said. The mosquitoes are black with distinctive white stripes, and if they are spotted, people are urged to call their local mosquito and vector control department.

Follow Jordan Mendoza on Twitter: @jordan_mendoza5.

https://www.usatoday.com/story/news/nation/2021/10/14/mosquito-prefers-biting-people-thriving-california/8440221002/

Los Angeles Times

Invasive Aedes mosquito expands reach in Los Angeles, Orange Counties

BY LILA SEIDMAN

OCT. 11, 2021

County vector control personnel informed Graham Jenkins and his wife late last month that the itchy bites on their ankles were the work of an insidious mosquito that had invaded their Gardena home — and that there was nothing they could do.

“These little buggers are living with us forever now,” Jenkins said.

A pair of bites on the 34-year-old’s wrist recently got infected and sent him to the emergency room. After a week of antibiotics, he said he was “almost back to normal,” but still wearing his watch on the other wrist.

The invasive Aedes mosquito is an aggressive biter with the ability to pierce clothing and reproduce in water sources as small as a bottle cap. Flying low to the ground, they strike during the daytime, preferring human blood to that of birds or other animals. They often strike multiple times in rapid succession.

Southern California pest experts say the mosquito is not only here to stay, but its reach — and season — are expanding.

It's believed that Aedes mosquitoes — which encompass three different species — first hitched a ride to Los Angeles County on shipments of lucky bamboo from China in 2001. But it wasn't until 2011, when complaints arose in El Monte, that the tenacious insects started to put down noticeable roots.

Since then, the flying bloodsuckers have expanded significantly throughout the county and beyond, and they're still turning up in new neighborhoods. And when they do, calls from confused — and itchy — residents begin spiking, according to vector control officials.

The mosquitoes this year began showing up in Sunland and Sun Valley, and even as far north as Santa Clarita and Castaic, and residents have been vocal about their plight, said Mary-Joy Coburn, director of communications for the Greater L.A. County Vector Control District.

"This is pretty much the first time a lot of these residents are experiencing these aggressive mosquitoes," she said. "So they have been calling us, trying to get more information."

A map of the mosquitoes' density within the district shows a tiny concentration near South El Monte in 2013. By 2020, that presence had ballooned, saturating almost the entire district on the map.

It's not just L.A. County that's seen a meteoric rise in the winged scourge. Areas to the south and north have all reported an uptick in "ankle biters."

They can't fly far, but they're tenacious and "smart," according to Coburn. A female mosquito might hitch a ride in a car and lay her eggs in the city she gets out in. Some people unwittingly gift plants carrying mosquito eggs. And they're capable of hopping fences into the neighbor's yard.

Orange County just recently confirmed the presence of the mosquitoes in every city there.

Laguna Beach — the final holdout — recorded its first incursion this past August, said Kiet Nguyen, a vector ecologist with the Orange County Mosquito and Vector Control District.

They're also pushing into Northern California, exhibiting a migration pattern that hews closely to the 5 Freeway, said Heather Hyland, a public information officer for the Orange County MVCD.

The insect's season seems also to be expanding.

"Our campaign was from June to August, and then you'd see relief," Hyland said, "but that's not the case anymore." Now they're arriving in April and lingering all the way into November, she said.

The insects are most prevalent in fall, peaking in September , — bucking the the perception of summer as traditional mosquito season , according to Levy Sun, director of communications with San Gabriel Valley Mosquito and Vector Control.

"Just like fire season, mosquito season is year-round," Sun said.

Jason Carter, 30, said the mosquitoes are "treacherous" in San Diego, where he lives.

The other week he was reading on a hammock in his backyard patio when he saw one of the creatures whiz by. He ran inside "to avoid its wrath." But it was too late. He later counted five bites.

Some have wised up to the ways of the Aedes.

John Gary and his family this year have armed themselves with "many devices and medicines and protocols," the 46-year-old Glendale resident said.

Last year, his son Nicholas, 11, struggled to sleep through the night because of itchy bites that manifested as large welts on his ankles and legs. He had so many marks that they thought they had bed bugs.

Gary slathers himself in DEET bug spray before going out, and the family installed a bug zapper in their dining room. They have also stocked sticks of bite balm, Benadryl, picaridin spray, bracelets infused with citronella and a syringe-type device designed to suck up irritants from bug bites.

Jenkins and wife Jasmine Chan have also taken measures to control the pests. They lather up with picaridin, keep fans under their desks, and water their houseplants minimally to limit their reproduction.

They're doing everything right, according to experts, who say repellent and elimination of even minute water sources — where they can breed — are the best ways to manage the mosquitoes.

Eradication, at least for now, is not in the cards.

Aedes can transmit diseases such as chikungunya, dengue and Zika, but they haven't been linked to an outbreak in California.

They haven't been tied to a case of the deadly West Nile virus, either. Meanwhile, their native brethren, the Culex mosquito, have been identified as sources of the deadly virus.

Aedes are considered a "nuisance mosquito" by vector control officials and therefore aren't of top concern.

Cutting-edge technologies in development could bring local relief — but probably not for several years.

California agencies are considering introducing sterile male mosquitoes into the population. The idea is that the male mosquitoes — made sterile through bacteria, gene modification or X-ray — will mate with the females and produce non-viable eggs, driving down the population.

Sun, of the San Gabriel Valley vector control district, said many find the idea "more palatable" than potentially spraying toxic pesticides. Other counties, including Miami-Dade, Fla., have tested the method in pilot programs.

“What better way to target a mosquito than a male mosquito seeking to mate?” he said.

However, Coburn said the technique is “not something on the table right now.” Some of the practices are still under review by the Environmental Protection Agency and would require regional adoption to work.

https://www.latimes.com/california/story/2021-10-11/invasive-aedes-mosquitoes-expand-reach-los-angeles-orange-county

The New York Times

Even California Has a Mosquito Problem

It looks as if an invasive species will be a regular summer scourge.

By Marie Tae McDermott

Sept. 22, 2021

When I moved to Los Angeles years ago, I was told by native Angeleno friends that the city without humidity also definitely did not have mosquitoes.

What is that whizzing sound then? The welts on my ankles? My favorite cafe has taken to selling bottles of insect repellent next to the cash register. Were my friends wrong, or should we acknowledge that this winged scourge is part of life in the Golden State?

Since 2011, scientists have tracked an invasive mosquito species in parts of California: the Aedes aegypti. These black-and-white-striped “ankle-biters,” which can transmit dengue fever, Zika virus and yellow fever, have been found up and down the state.

Alec Gerry, a professor of entomology at the University of California, Riverside, said it was not necessarily that the mosquito population had increased in size but rather that the habits of this invasive species were far more noticeable.

The native Culex mosquito tends to emerge at night, preferring to feed on birds, but nonnative mosquitoes have adapted extremely well to life here. They hunt for blood during the daylight hours when people are most active, often going undetected after biting below waistlines. This particular species also has an annoying habit of snacking — aggressively biting a host multiple times in one feed. Laying eggs just above the surface of water, the Aedes aegypti can breed in a bottle cap or the finger holes of a bowling ball. The eggs can lie

dormant after drying out for up to a year, hatching once they come in contact with water again.

Levy Sun, communications director for the San Gabriel Valley mosquito and vector control district, told me that longer spells of warm weather and man-made environments featuring lush, tropical vegetation are contributing to the proliferation of this species. Mosquitoes have a hard time regulating their body temperatures, so they often seek relief from the heat in shady yards. If you notice an uptick in bites, it's probably because they have set up shop nearby.

Mosquito infestations come and go depending on how hospitable you make it for them. "They wash over neighborhoods in waves," Sun said.

Controlling the mosquito population is extremely tricky, but eliminating all sources of standing water is a good starting point. Use insect repellent if you don't want to get bitten. Call your local vector control office if you need help finding potential breeding sites. Some counties will send fish that eat mosquito larvae.

California has had native mosquitoes going back to the gold rush days, when malaria tore through populations and had to be eradicated by aggressive mosquito abatement programs. Nonnative mosquito species were introduced to the state gradually through global trade; in 2001, health officials linked an outbreak of Aedes albopictus in Southern California to a shipment of lucky bamboo plants from Taiwan.

The preponderance of these pests should lessen by the end of October, when colder nighttime temperatures affect their life cycles until they reappear again in May. However, it looks likely that the Aedes aegypti will continue to be a scourge on our summers.

Sun, who zaps mosquitoes in his house with an electric racket, said that while efforts should be made to control the population, total eradication was not very likely at this point.

"They survived the dinosaurs and lived until now," he said.

https://www.nytimes.com/2021/09/22/us/california-mosquitoes.html

The Washington Post

Climate change lets mosquitoes flourish — and feast — in Los Angeles

Warmer weather has allowed the pesky bugs to multiply and thwart attempts to slow their spread

By Erica Werner
September 19, 2021

LOS ANGELES — Many try and fail to make it in L.A. But one group is proving unstoppable: mosquitoes, which have taken over Southern California and are driving the humans here crazy.

New invasive, disease-bearing species originating from Asia and Africa are thriving in the increasingly long, hot and humid summers afflicting this region thanks to climate change, according to numerous public health officials. Their growing numbers are baffling and infuriating Angelenos, who, until recently, considered themselves largely exempt from the buzzing bloodsuckers that make summers miserable in much of the rest of the country.

Experts say they're here to stay. And even though mosquitoes don't pose the same danger to lives and livelihoods as wildfires or drought — at least not yet — they have become a biting reminder of an increasingly inhospitable natural world where climate change seems to pose constant new hazards.

"Californians have never experienced mosquito bites like they currently are having to endure due to these new daytime biters," said Susanne Kluh, director of scientific-technical services at the Greater Los Angeles County Vector Control District. "This is really, really putting a big burden on our lifestyle. It's life-changing for Californians."

Kluh's agency, funded by property taxes, is one of several in Southern California that aim to help residents control mosquitoes and detect and stop the spread of any diseases they may carry.

"Mosquitoes in L.A. seems like yet another sign that the world is crumbling around us," said Tatiana Krokar, a 49-year-old sketch comedian who lives in the Silver Lake neighborhood. "I mean, what's next — plague of locusts? Lake of fire?"

Many Los Angeles residents like Krokar have the impression that mosquitoes are new in town, but that's not technically the case. A small brown mosquito with the scientific name Culex has long resided here, emerging at dawn and dusk to bite birds and occasionally people. The Culex can spread West Nile virus but are often unobtrusive, and many people barely knew they existed.

What's new is a black-and-white-striped insect called Aedes, a nonnative variety that includes yellow fever mosquitoes and Asian tiger mosquitoes. The yellow fever mosquitoes in particular — technically known as Aedes aegypti — are aggressive biters drawn to humans at all hours. They breed in standing water, and their eggs can lie dormant for months or even years on dry surfaces. In addition to yellow fever, they can transmit Zika, dengue fever and other diseases to humans and pets.

Populations of these frightening insects have grown steadily around Southern California in the past several years, even explosively in some areas. Residents are increasingly aware of and alarmed about their presence, and the mosquitoes are overwhelming the efforts of local government agencies to control them.

There have been no recent instances in Southern California of tropical diseases such as yellow fever or Zika spreading within the community, but officials fear that could happen and prove life-threatening for the public, given the growth of the mosquito populations in the area.

"These threats will continue to move and put our population at risk, so we need to all stay vigilant," said Umme-Aiman Halai, a medical epidemiologist at the L.A. County Department of Public Health. "A mosquito in one person's backyard affects the entire community."

The best advice scientists and public health officials have for residents is to eliminate any standing water where mosquitoes love to breed. But it has to be a neighborhood effort, since mosquitoes can easily travel from one yard to another, and despite the drought many Southern Californians are reluctant to limit watering their lush greenery and well-tended lawns, where water can collect within plant fronds or around sprinkler systems. Kluh expressed some frustration that L.A. residents have gone from not knowing her agency existed to finding it useless since she and her staff are unable to make mosquitoes disappear from people's yards.

"Despite our best efforts, the population is still growing," Kluh said. "Every year the numbers in our traps have been multiplying. They just keep biting people like crazy."

Officials from Kluh's Vector Control District recently visited the home of Jessie Schiewe, 32, a writer who lives with her fiance and two chihuahuas in the Eagle Rock neighborhood. A technician tramped up and down picturesque but rickety staircases in Schiewe's foliage-filled yard, examining an empty birdbath standing near a collection of ceramic mushrooms, and training a flashlight behind potted plants. The technician was looking for any standing water but didn't find any. That left Schiewe feeling "quite despondent" over her apparent inability to control the pests that have left bite marks and scabs all over her ankles and feet.

“I itch every bump — I can’t stop myself!” she said. Like other sufferers, Schiewe will be left to endure the mosquitoes through a variety of methods, donning long sleeves and pants while watering, purchasing dubious mosquito-control gadgets from the Internet or simply hiding inside, with the doors closed when she’d rather be out on the porch.

“After a hot day, you want to cool down and sit outside and smoke a joint and then you’re bombarded,” said Schiewe, a native Angeleno who doesn’t remember mosquitoes ever being a problem when she was growing up (marijuana is legal for recreational use in California). “It’s frustrating because it’s like, let me go outside and enjoy my space. … You’re not paying rent here!”

The invasive mosquitoes are thought to have arrived in Southern California through various means, including in shipments of “lucky bamboo,” the decorative bamboo arrangements that are meant to bring good fortune and have been transported from Asia, already prepared in small vases of water. Government officials were able to detect and stamp out some earlier incursions, but in recent years, the mosquitoes have gotten the best of the humans, and now no one thinks they’re going anywhere.

A number of scientists say climate change has played a role in the mosquitoes’ spread, with California summers growing longer and hotter. Less rainfall is creating ripe conditions for wildfires, yet at the same time, rising ocean temperatures have led to more humidity.

“These are tropical mosquitoes, so the fact they were able to entrench themselves in our Mediterranean climate — or what should be a Mediterranean climate — boggled our minds at first,” said Levy Sun, communications director of mosquito and vector control in San Gabriel Valley, just east of L.A. “They just erupted across Southern California in a few short years.”

Longer term, the picture could shift if climate change continues to worsen the drought, ultimately forcing Californians to cut back on water use and abandon lawns and greenery in favor of succulents or rock gardens. Scientists are also exploring several methods of limiting populations of mosquitoes, mainly by reducing their ability to reproduce. This could include releasing sterile males to mate with females, which are the ones that bite — an approach that has proved successful in cutting down fruit fly populations in the state. But these types of solutions could be years away if they ever pan out at all.

This has all created enormous demand for pest control.

Orkin recently named Los Angeles the No. 1 city in the nation for mosquitoes based on the number of customers served, edging out Atlanta. And a company called Mosquito Squad has opened several new franchises in the area and dispatches goggle-clad crews to douse yards with natural or synthetic pest control agents they say can keep treated areas mosquito-free for several weeks.

https://www.washingtonpost.com/us-policy/2021/09/19/climate-mosquito-los-angeles/