

Uncovering the city's mosquito hot spots

ASU lab uses field, lab research to help Maricopa County predict, prevent spread of West Nile virus

By Sona Patel Srinarayana, ASU News
October 16, 2025

Mosquitoes aren't just a nuisance; they can carry diseases like West Nile virus, which can be transmitted to humans — and research shows their populations are on the rise in the U.S. despite city- and county-level efforts to target them.

"West Nile virus spreads to humans when mosquitoes bite infected migratory birds and then bite people," said Assistant Professor [Kelsey Lyberger](#), who is investigating how local mosquito behavior is impacting public health. "The mosquito landscape has changed. They have increased in abundance, and we can attribute this to warmer climates and weather events like Arizona monsoons."

Lyberger and her team of student researchers at the [Lyberger Lab](#) are putting a microscope on Culex mosquitoes, one of the more prevalent types in the U.S. that carries West Nile virus, to understand where, when and why they are thriving.

They plan to use this data to inform Maricopa County on how best to cap mosquito populations and, as a result, mitigate disease transmission to humans.

How do mosquitoes survive extreme heat?

Since launching their research project in early summer, Lyberger and her students have logged temperatures at 24 microhabitats across Phoenix, such as well-watered plant nurseries and murky park drains.

Her team collected mosquito larvae at each site in search of an answer to the question: "Isn't a Phoenix summer too hot for mosquitoes?"

Lyberger and fourth-year student Chloe Martz, who is studying [natural resource ecology](#) in the applied biological sciences program, part of the [School of Applied Sciences and Arts](#) at the College of Integrative Sciences and Arts, collaborated to

Why this research matters

Research is the invisible hand that powers America's progress. It unlocks discoveries and creates opportunity. It develops new technologies and new ways of doing things.

Learn more about ASU discoveries that are contributing to changing the world and making America the world's leading economic power at researchmatters.asu.edu.

develop the logistics of this program.

“We collect mosquito larvae in the field and rear them in the lab until they are adults,” Martz said. “We identify the species to determine their critical thermal maximum and compare the temperatures we recorded at each site to figure out how often each site gets above the mosquitoes' thermal maximum, and compare this to the city's weather station data.”

Lyberger, Martz and other undergraduate students observed that the temperatures they logged at their sites were cooler than the city's weather station data, which is collected at places like the airport, painting a more accurate picture of why mosquitoes are thriving.

Even so, Lyberger said, “These hearty little creatures are living on the edge of their critical thermal maxima,” or the maximum temperature that mosquito larvae can withstand.

“They can either adapt through acclimation, where physiologically they can prepare for hot temperatures, or evolutionarily, meaning different mosquito populations are more adapted to the heat,” said Lyberger, whose past research included gathering a global dataset of dengue fever cases to understand the role of temperature on disease transmission in Asia and the Americas.

Using their newly discovered data, Lyberger and her students will use mathematical modeling, combined with more precise temperature data, to predict mosquito seasonality.

“We hope to use our findings to inform Maricopa County [Vector Control](#) and public health agencies of where and when transmission will occur, so they can be more targeted in mitigating populations with fogging and other methods,” Lyberger says. “Maricopa County Vector Control has a rich dataset of mosquito abundance, so I'm also using statistical approaches to learn how effective their treatment has been.”

Applied experience and what's next

Martz says this research has developed her fieldwork, coding, data organization and troubleshooting skills — all critical to her next steps as a graduate student and, eventually, her career in entomology.

“The hands-on work is engaging. I get to go out into the field to identify plants and animals. It's what future employers want to see on my resume, and it makes the classes interesting,” Martz said. “When I get back to the lab to process the data, I get to see the results of what I've been working so hard to achieve. It's those 'aha' moments that are so rewarding.”

Lyberger says that applied biological students have limitless career options across the sciences, including environmental science, epidemiology, public health, data science and academia, among various other industries.

As a researcher who focuses on how organisms adapt to shifting environments, Lyberger is planning for future work that will include [mapping the U.S. mosquito invasion fronts](#) to address the more dangerous dengue fever, likely to become an issue locally as temperatures warm.

It will also include delving into short-term and long-term weather disturbances — such as heat waves and hurricanes — or seasonality, and its impact on mosquito survival and disease

transmission.

As she continues her research in this realm, Lyberger looks forward to bringing her students along and inspiring the next generation of scientists to make discoveries of their own.

This story originally appeared on [ASU News](#).

Main image



Applied biological sciences undergraduate Alex Vela analyzes mosquito larvae at a local plant nursery as part of the Lyberger Lab's ongoing mosquito research. Undergraduate research opportunities are common in ASU's College of Integrative Sciences and Arts. Photo by Henry Lu/ASU