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## Invasive Mosquito Pushes West



**Image Title:** A female *Oc. japonicus* from Frederick, Maryland, feeding on a human arm. - Larry Ostby/US Army Medical Research Institute of Infectious Diseases

A student doing research at a biological field station just outside St. Louis has discovered an invasive Asian mosquito that is capable of carrying West Nile virus and St. Louis encephalitis. It is the first report of *Ochlerotatus japonicus* in Missouri and the farthest west the species has ever been seen in the central United States.

Stephanie Gallitano, a junior chemistry major at Washington University in St. Louis; her mentor, postdoctoral fellow James Vonesh; and co-author Leon Blaustein from Rutgers University will report their findings in the December 2005 issue of the *Journal of Vector Ecology*. The journal agreed to announce the findings early.

Gallitano, who is from Chicago, was studying native mosquitoes' egg-laying habitat selection at the university's Tyson Research Center in Eureka, Missouri, just outside the St. Louis metropolitan area. The field work was part of a Howard Hughes Medical Institute (HHMI) summer undergraduate research project.

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- **Stephanie Gallitano**

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When she took eggs from the ponds back to the laboratory to raise and identify, some developed into a type of insect that she didn't recognize.

The unfamiliar species was the second most common found in the pools, outnumbered only by the common house mosquito. This indicates that the population was well-established by the time it was detected, Vonesh said.

"Both the body dimensions and hair distribution were really different from anything I'd seen before," said Gallitano. She consulted Vonesh, and together they looked through a book on North American mosquitoes, but they still were unable to identify the species.

So Gallitano and Vonesh sent larvae specimens to Leon Blaustein, an ecologist who spent a sabbatical at Washington University last year. Blaustein, a co-author on the paper, holds joint appointments at Rutgers University and the University of Haifa in Israel. His Rutgers laboratory identified the mysterious mosquito as *Oc. japonicus*.

*Oc. japonicus* is native to Japan and other countries in eastern Asia. It carries West Nile virus and also spreads encephalitis to swine in its native habitat. First reported in New York and New Jersey in 1998, where it was believed to be incubating in standing water trapped in rubber tires, the invasive mosquito had been reported in at least 19 other eastern states by 2003.

Vonesh said it is highly likely that *Oc. Japonicus* has spread to Missouri from the east, which means it's probable that the species is also in Illinois and perhaps in other midwestern states. Aside from records from in Washington state, the farthest west the mosquito had been documented was Michigan, the researchers said.

"I thought it was interesting that it's only taken seven years to spread from New Jersey," said Gallitano. "Finding the invasive species was definitely a high point of my summer," she added. "Not every student can experience the thrill of setting a new state record during their fieldwork. Even more amazing was the help and encouragement I received from fellow biologists during the weeks following the discovery. Being first author on a journal article is incredible, an achievement most undergraduates cannot experience, but I could not have done it without the help of several scientists."

Jonathan Chase, the Washington University associate professor of biology in whose lab Vonesh and Gallitano work, said that there is not yet enough information to fully assess the impact of the find. "*Oc. japonicus* is a forest species," Chase said, "and we know little about its ecology or feeding preferences."

"Wild populations of this species have tested positive for West Nile," said Vonesh. "But has this mosquito ever transmitted it to a human? That we don't know."

"Birds are the primary reservoir of the disease, and humans are the 'accident,'" said Chase. "The disease doesn't want to be in the human. We don't amplify it; we don't give it back to the mosquito and keep it going."

Assessing the mosquito's impact as a disease vector involves knowing more about its interactions with other mosquitoes, the researchers said. It is possible that *Oc. japonicus* could replace another mosquito that is a better vector for West Nile virus. In that case, the invasive species could actually reduce the potential for disease transmission. On the other hand, *Oc. japonicus* may turn out to be a better disease vector than a native species.

"People are very concerned about *Oc. japonicus*," said Chase, "but being scared before you have all the information is narrow-minded." The researchers plan to investigate the ecology of *Oc. Japonicus* and its interactions with other mosquitoes.