

West Nile Virus Spreading Due to Mosquitoes in Orchards and Vineyards, Experts Warn



Washington State University researchers have linked orchards and vineyards with a greater prevalence of West Nile virus in mosquitoes and the insects' ability to spread the virus to birds, horses and people.

The finding, reported in the latest issue of the journal PLOS ONE, is the most finely scaled look at the interplay between land use and the virus's activity in key hosts. By giving a more detailed description of how the disease moves across the landscape, the study opens the door to management efforts that might bring the disease under control, says David Crowder, a WSU entomologist and the paper's lead author.

Since it was first seen in New York in 1999, West Nile virus has reached across the country and shown few signs of abating. Last year, the U.S. Centers for Disease Control had the highest number of reported cases -- 5,387, including 243 deaths -- since 2003.

Roughly one in five infected people experience a fever, headache, body aches and, in some cases, a skin rash and swollen lymph glands. One in 150 people can get a high fever, headache, neck stiffness, disorientation and neurological problems.

Most efforts to figure out the ecological workings of the virus have focused on reports of infected people, "a crude indicator at best," says Crowder. Almost all victims have no symptoms or are misdiagnosed, while others can be infected far from where they file a report, he says.

Agricultural areas have seen higher percentages of infected people, but that still does not get at the underlying mechanism.

"Is that because there are more birds there?" says Crowder. "Is that because there are more mosquitoes there? That hasn't really been linked together."

Crowder, working with fellow entomologist Jeb Owen, other WSU colleagues and the state Department of Health, merged data from a variety of sources, including West Nile infections in humans, horses and birds, surveys of virus-bearing mosquitoes, breeding bird surveys, and detailed land use maps and climate data from around the Northwest.

The researchers found that habitats with high instances of the disease in horses and birds also have significantly more mosquitoes -- as well as American robins and house sparrows, the two bird species implicated the most in the disease's transmission.

"These same habitats are also resulting in much higher rates of infection within mosquitoes themselves," said Crowder.

"We find that all three of these things -- abundances of house sparrows and American robins, abundance of mosquitoes and the actual prevalence of West Nile in mosquitoes -- are increasing in landscapes with a higher proportion of land in orchard habitats." These habitats, says Crowder, include both orchards and vineyards.

It's still unclear why the habitats would create such a perfect storm for the virus. The researchers speculate that mosquitoes are drawn to orchards for plant nectar during flowering, while robins and house sparrows use them for nesting and feeding. Together, the insects and birds become focal points for the disease.

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