"Mosquitoes are becoming increasingly resistant to currently used insecticides. There is an urgent need to find new ways of killing mosquitoes to advance efforts to control diseases such as malaria and dengue, which sicken millions of people worldwide."

— Michael Gottlieb, deputy director, Science Division, Foundation for the National Institutes of Health

OARDC entomologist Peter Piermarini has found a new way to kill mosquitoes, which is desperately needed to protect people worldwide from deadly diseases.

Bad for mosquitoes, good for people

A new product to fight the most dangerous creature on Earth

Mosquitoes are capable of ingesting the equivalent of their body mass in blood, which means they need to immediately get rid of excess water and salt. They accomplish that by urinating on their host — while still feeding.

Ohio Agricultural Research and Development Center entomologist Peter Piermarini and his collaborators are studying the highly effective "kidney" function of mosquitoes to turn it against them: "What we are trying to do is find a way to cause 'kidney' failure in mosquitoes," Piermarini said. "We have found a chemical that interferes with a mosquito's ability to excrete urine. It also leaves mosquitoes unable to fly and severely bloated."

This discovery could pave the way to the development of new insecticides to fight deadly mosquito-transmitted diseases such as malaria and West Nile virus.

Piermarini's research is funded by a $1.4 million grant from the Foundation for the National Institutes of Health's New Insecticides for Malaria Control program, which is supported by the Bill & Melinda Gates Foundation.

More: **go.osu.edu/U8z**

Essentials

- Mosquitoes are considered the most dangerous creatures on Earth due to the many potentially fatal diseases they transmit to humans and animals.
- West Nile virus infected 33,026 people in the U.S. between 2000 and 2012, resulting in 1,542 deaths. During that same period, 857 people contracted the virus and 59 died in Ohio.
- In 2010, malaria affected an estimated 216 million globally, resulting in 655,000 deaths — most of them children younger than five.
- Dengue infects 50–100 million people around the world every year. Hundreds of thousands of them require hospitalization and tens of thousands die. The total economic impact of dengue in Asia and the Americas alone is estimated at $1.8 billion annually.

Ohio Agricultural Research and Development Center

As the research arm of The Ohio State University's College of Food, Agricultural, and Environmental Sciences (CFAES), the Ohio Agricultural Research and Development Center (OARDC) employs nearly 650 scientists and staff members throughout the state.

Its Wooster campus is the largest agbioscience research facility in the United States, and OARDC scientists work closely with researchers in Ohio State's Colleges of Education and Human Ecology, Medicine, Public Health, Veterinary Medicine, Biological Sciences and Engineering.

At any given time, OARDC researchers are engaged in more than 400 research projects. Primary focus is in three signature areas:

- Advanced Bioenergy and Biobased Products
- Environmental Quality and Sustainability
- Food Security, Production and Human Health

The Ohio General Assembly established OARDC as the Ohio Agricultural Experiment Station in 1882. It is supported by a line-item appropriation from the Ohio General Assembly, competitive grants, gifts, contracts, federal grants and other sources. OARDC uses these funds to provide direct research support and economic development for Ohio's annual $100+ billion agbioscience industry. OARDC is not funded by student tuition or any other general funds of The Ohio State University.

OARDC: A Leader in Agbioscience

ag•bi•o•sci•ence (ăg'bī'ō-sī'ens) *n.* the integration of scientific disciplines to address critical needs of food security, safety and health; environmental sustainability; and biobased energy, fuel and products

Food Security, Production, and Human Health

Environmental Quality and Sustainability

Advanced Bioenergy and Biobased Products

THE OHIO STATE UNIVERSITY
COLLEGE OF FOOD, AGRICULTURAL, AND ENVIRONMENTAL SCIENCES

AGBIOSCIENCE: OARDC
BRINGING KNOWLEDGE *to* LIFE

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