FOR MORE INFORMATION: www.ars.usda.gov/Controlling-Insect-Pests-to-Protect-Plant-Animal-and-Human-Health/

CONTROLLING INSECT PESTS TO PROTECT PLANT, ANIMAL, AND HUMAN HEALTH

ARS collaborates across the human, animal, and environmental health communities to achieve sustained health outcomes for plants, animals, and people. Research at ARS informs and provides solutions to improve the U.S. biodefense posture and encompasses animal health; medical, veterinary, and urban entomology; plant health; and natural resources and sustainable agricultural systems. The following FY 2020 accomplishments illustrate ARS efforts to eliminate arthropod vectors and nullify their impacts.

New and quick method to identify cattle fever ticks resistant to pyrethroids. ARS scientists in Kerrville and Edinburg, Texas, and Pullman, Washington, and collaborators at Northern Arizona University and the University of Queretaro (Mexico) developed a new and quick method to identify cattle fever ticks resistant to pyrethroids. This molecular assay can be completed overnight while the traditional bioassay method takes 6 weeks to complete. The ability to quickly detect pyrethroid-resistant ticks enables selection of the proper pesticide to use on wildlife to prevent the spread of fever ticks to cattle during outbreaks.

Ag100Pest project opens new opportunities for invasive pest control. The Ag100 Pest Initiative, led by ARS, develops high quality reference genome assemblies for the top 100 U.S. arthropod agricultural pests. These genomic resources are critical for the development of biobased tools for biosecurity. In FY 2020, the Ag100 Pest Initiative sequenced the complete genome of the Asian giant hornet, a deadly predator of honeybees first spotted in North America in 2020. The initiative has also sequenced the first genome of spotted lanternfly, an invasive pest of hardwoods and several specialty crops.

> **The Ag100 Pest Initiative sequenced the complete genome of the Asian giant hornet, a deadly predator of honeybees first spotted in North America in 2020.**

Environmental temperature affects the ability of mosquitoes to transmit Rift Valley fever virus (RVFV). In a study of two mosquito species, ARS researchers in Manhattan, Kansas, and collaborators at the U.S. Army Medical Research Institute for Infectious Diseases found that increased temperature was associated with increased potential for mosquitoes to transmit RVFV as well as more rapid and efficient infections. These data on the effects of ambient temperature facilitate development of more accurate models to assess RVFV persistence and spread in nature should a disease outbreak ever occur in the United States.

Pesticide-resistant mosquitoes pose challenges to protecting military. ARS researchers in Gainesville, Florida, and U.S. Department of Defense collaborating scientists found that permethrin-treated military uniforms may be ineffective against pyrethroid-resistant strains of *Aedes aegypti*, a vector of numerous human diseases. Fortunately, they found that DEET-based repellents are still effective against *Aedes aegypti* resistant to pyrethroids. This information will lead to changes in approaches used to protect at-risk military members operating in areas where pyrethroid-resistant mosquitoes exist.