Report on the ovitrap survey for mosquitoes and *Aedes albopictus* in Wisconsin, 2016

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Summary

An important aspect in the management of emerging vector-borne diseases is tracking and controlling populations of potential vectors. An ovitrap survey for *Aedes albopictus* was conducted between June 20 and Sept 9, 2016 in Wisconsin. The University of Wisconsin Medical Entomology Laboratory and Wisconsin Department of Health Services coordinated with local public health offices representing 20 counties in southern and western Wisconsin to survey for eggs of potential vectors of the Zika virus. A total of 225 traps were set out for all or part of the survey, with each trap monitored weekly for mosquito eggs. Eggs were hatched in the lab and identified in the fourth instar larval stage. No *Aedes albopictus* (Skuse) or *Aedes aegypti* were identified in any of the ovitrapcollections.

Two species were identified in the survey. These mosquitoes, *Aedes triseriatus* and *Aedes japonicus* (also called *Ochlerotatus japonicus*) are potential vectors of arboviruses that occur in Wisconsin. *Aedes triseriatus*, an important vector of La Crosse virus, was found in every county and was usually the dominant species in ovitraps. *Aedes japonicus* is an invasive species that was first identified in Wisconsin in 2004 in Monroe County. This species was detected in 13 of the 20 counties and dominated collections in Grant and Waukesha counties. *Ae. japonicus* can transmit La Crosse virus and is thought to play a major role in transmission of this virus to humans in West Virginia. Future work should include analysis of the role of *Ae. japonicus* in La Crosse virus transmission in Wisconsin.

Introduction

In 2016, the CDC released an updated estimate of the range of *Ae. albopictus*, showing the northern margin near the southern border of Wisconsin. In recent years, *Ae. albopictus* has been reported in Minnesota, Illinois, and Iowa - states sharing borders with the southern and western Wisconsin counties. *Aedes albopictus*, in addition to its potential role in ZIKV transmission, is a competent vector for at least 22 other arboviruses, highlighting its importance for monitoring and management.

To assess local risk of the establishment of ZIKV and other arboviruses carried by *A. albopictus*, the Wisconsin Division of Public Health and the UW Madison Medical Entomology Laboratory (UWMEL) partnered with representatives of 20 local public health departments in southern and western Wisconsin to undertake a 12-week ovitrapping survey to identify container-breeding mosquitoes and to monitor for the emergence of *Ae. albopictus* populations. Ovitraps were set out by environmental and public health partners with weekly collections of the egg sticks. Sticks with potential eggs attached were shipped to UW Madison for hatching, growth and identification.

Results

The UW received 830 submissions from 20 counties over the 12-week 2016 collection period (from June 20 through September 9). Of the 830 submissions received, 313 sticks (34.4%) were positive for mosquito eggs. County participation varied; positive submissions ranged from 1 to 52 per county (with an average of 14 positive submissions per county) and weekly traps set varied from 1 to 27 (see Figure 1). Of the 313 positive submissions, 277 were successfully hatched (92% hatch success). Two species of mosquito were identified over the course of the survey: *Ae. triseriatus* and *Ae. japonicus*. Of the 277 hatched pools, 236 had at least one *Ae. triseriatus*, while 64 had at least one *Ae. japonicus* (included in these numbers are 23 pools which had both species).

Aedes triseriatus was found in all counties and was the only species collected in Trempeleau, Vernon, Crawford, Adams, Sauk, Rock and Racine Counties. In general, these were counties where fewer traps were deployed which may have reduced the potential for detection of *Ae. japonicus*. *Ae. japonicus* was found in 13 of the 20 counties, ranging as far north as Eau Claire and Buffalo counties and in all southern tier counties except for Rock and Racine (Figure 2). *Ae. japonicus* was especially common in ovitraps set in Waukesha and Grant Counties but was also common in Eau Claire, Buffalo, Milwaukee, and Green Counties. This overall pattern indicates that *Ae. japonicus* is established throughout southern and western Wisconsin. Both species were found to be ovipositing in the traps during each month of the 3 month survey (Figures 3-5).

Future studies

Since the 2016 survey did not identify populations of *Ae. albopictus*, any introductions of this species are likely to be focal and hard to detect. Most of the detected infestations in Minnesota, Iowa and the Chicago area were related to tire imports. Thus, future surveys for *Ae. albopictus* in Wisconsin should be focused on tire piles, tire recycling facilities and industrial corridors. In addition, the current distribution of this species in the Midwest is defined by USDA Zone 6

(plant growth zone). Surveillance for *Ae. albopictus* in microenvironments where winter temperatures are affected by Lake Michigan may also be warranted.

Although potential vectors of Zika virus were not identified in this survey, results indicate that the potential for La Crosse virus transmission by *Ae. japonicus* is now widespread in Wisconsin. Because this mosquito is a major vector in other regions in the U.S., monitoring for changes in LACV incidence by county is indicated.

Figure 1. Participating counties and number of ovitraps deployed.

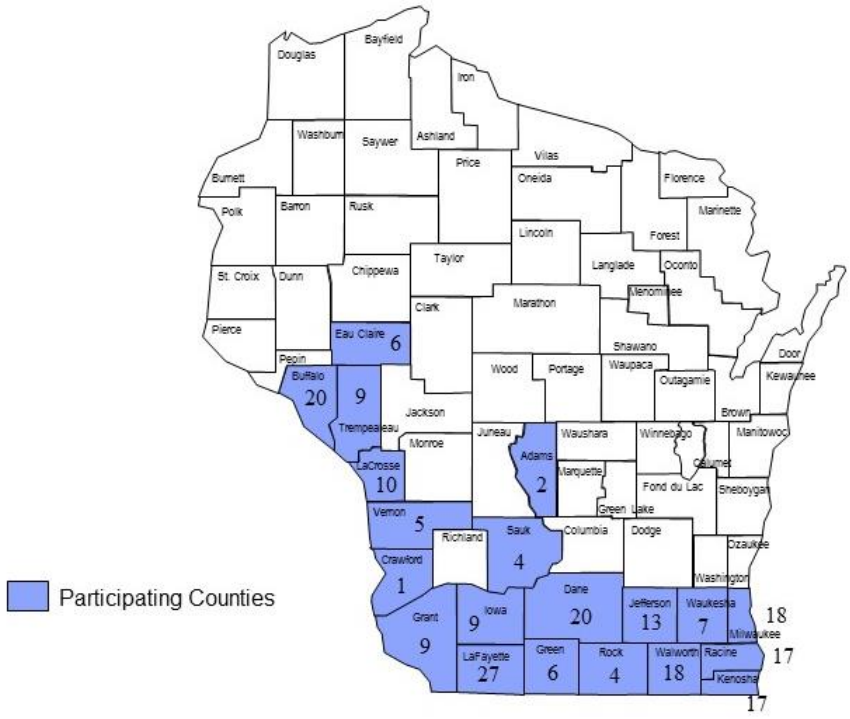

Figure 2. Overall distribution of mosquito species surveyed by ovitrap collections in Wisconsin counties 2016.

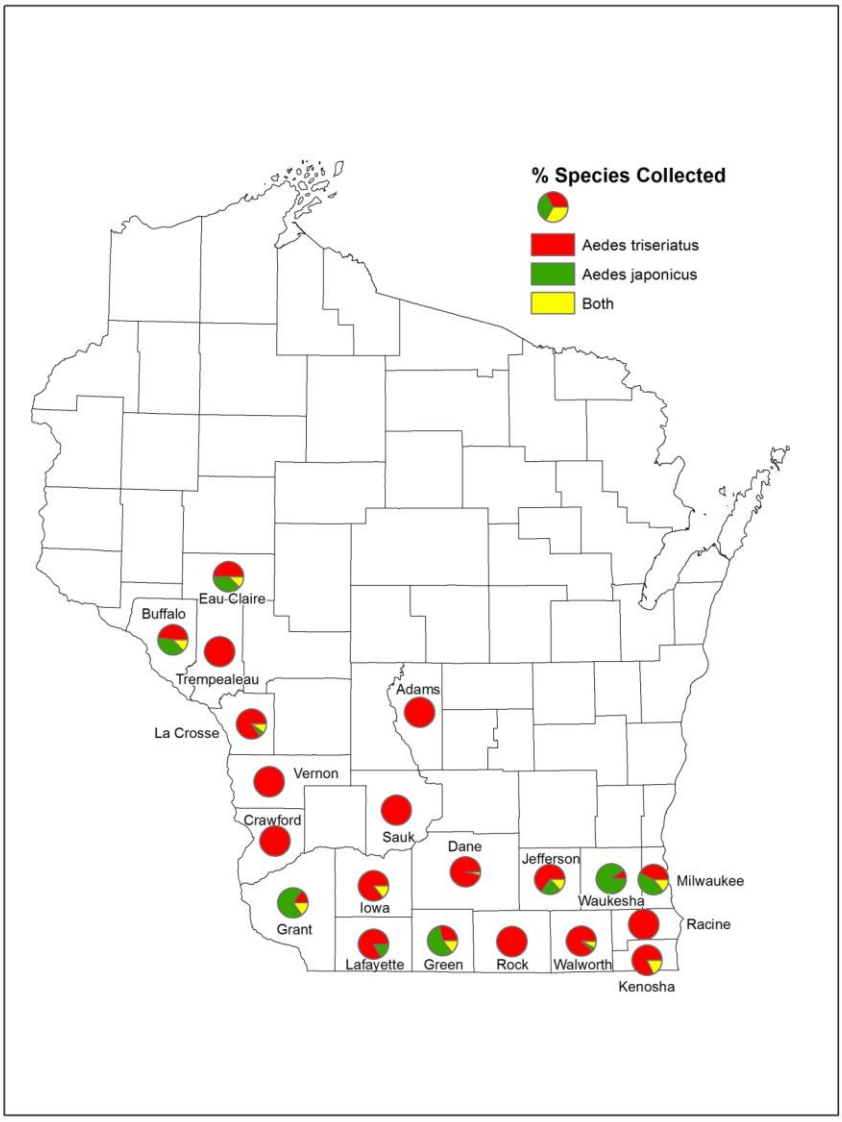

Figure 3. The species breakdown by county for June 2016

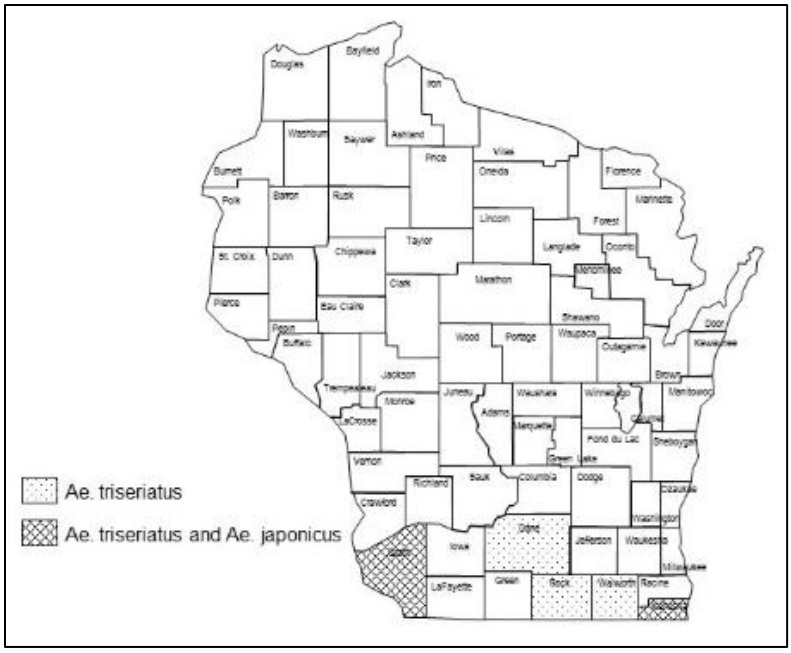

Figure 4. The species breakdown by county for July distribution (note that Waukesha county in July is the only Aedes japonicus-only coded county).

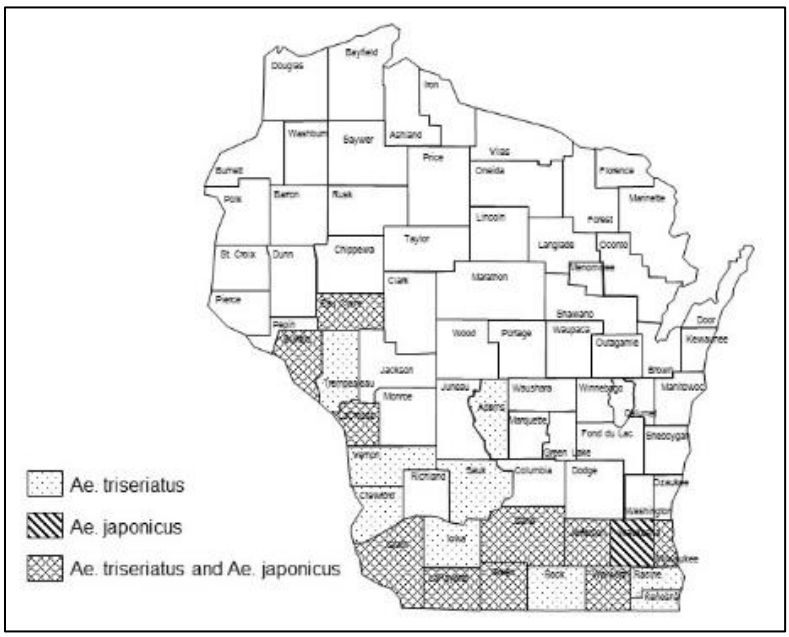

Figure 5. The species breakdown by county for August and into September.