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Mosquito and Arbovirus Activity

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Abstract
Mosquitoes are public health concerns as vectors of arthropod-borne viruses (arboviruses) and/or as nuisances to humans, so surveillance efforts are important to determine areas and times that may pose a risk. The Horticulture Research Station (HRS), Ames, Iowa, consistently yields mosquitoes that are positive for West Nile virus (WNV). Objectives were to continue to assess human risk by monitoring both mosquitoes and sentinel chickens, which serve as vertebrate hosts for arbovirus.

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Mosquito and Arbovirus Activity

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Introduction

Mosquitoes are public health concerns as vectors of arthropod-borne viruses (arboviruses) and/or as nuisances to humans, so surveillance efforts are important to determine areas and times that may pose a risk. The Horticulture Research Station (HRS), Ames, Iowa, consistently yields mosquitoes that are positive for West Nile virus (WNV). Objectives were to continue to assess human risk by monitoring both mosquitoes and sentinel chickens, which serve as vertebrate hosts for arbovirus.

Materials and Methods

A New Jersey light trap (NJLT), which monitors mosquito species and abundance, was in operation daily May 26-October 2, 2012. A NJLT uses light as a mosquito attractant and functions from 6 p.m. to 8 a.m. every day through an automatic timer. Collection cups were brought to our ISU lab, where mosquitoes were identified to species and counted for measures of abundance.

A gravid trap, which collects mosquitoes to be tested for arbovirus, operated May 22-September 28. A gravid trap uses organically infused water to specifically attract females ready to lay eggs, thus targeting those that have recently fed on blood and may have been exposed to arbovirus. Mosquitoes were stored at -80°C and processed on refrigerated tables to preserve the virus. Mosquitoes of the same species and collection week were grouped into pools and sent to the University Hygienic Lab (UHL), Iowa City, for arbovirus testing. Specimens of *Ae. triseriatus* were tested for LaCrosse virus. Specimens of *Culex* mosquitoes were tested for WNV.

On June 5, eight chickens were delivered to the HRS and housed in a coop. Blood samples were collected from the chickens once per week until October 2. Blood samples were sent to the UHL for WNV testing.

Results and Discussion

Mosquitoes were not abundant at the research farm in 2012 (Table 1). This was true for most of Iowa due to drought. The most common mosquito was *Culiseta inornata*, the cool-weather mosquito that is common in spring and summer. It is neither a nuisance nor a vector. Second in abundance was the ubiquitous *Ae. vexans*, a nuisance mosquito, followed by *Cx. pipiens* group mosquitoes, which is the species from which WNV is most commonly isolated in Iowa and at the HRS.

West Nile virus was isolated from both chickens and mosquitoes in 2012. The first chicken to test positive was from the week of August 20. By the end of the surveillance season (week of October 1), four more chickens had tested positive, leaving five of the eight birds in the flock positive for WNV. This is in contrast to no chickens testing positive last year. Additionally, four pools of *Cx. pipiens* group mosquitoes tested positive for WNV (out of 42 pools collected all year). These were collected August 30–September 20. No other arboviruses were detected in mosquitoes.

The gravid trap collected 100 times as many *Cx. pipiens* group mosquitoes as the NJLT collected this year. This shows how effective the gravid trap is in targeting this vector

species. The abundance of this vector implies the importance of continued surveillance.

Despite low mosquito abundance, WNV activity was observed in both vectors (mosquitoes) and hosts (chickens) at the HRS. It continues to be an important location for monitoring its epidemiology in Iowa. This year was an interesting one for WNV across the country, and we hope to learn more through continued surveillance.

Acknowledgements

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Table 1. Mosquito yields from New Jersey light trap in 2012.

Mosquito species	Female	Male	Total
Aedes vexans	18	4	22
Culex erraticus	2	0	2
Cx. pipiens group	13	0	13
Cx. tarsalis	6	2	8
Culiseta inornata	31	2	33
Uranotaenia sapphirina	2	0	2

Table 2. Arbovirus testing of gravid trap-collected mosquitoes in 2012.[a]

Mosquito species	Tested	Untested	Positive WNV Pools
Aedes triseriatus	5 (6)	0	N/A
Ae. vexans	0	1 (1)	N/A
Anopheles punctipennis	0	2 (2)	N/A
An. quadrimaculatus	0	1 (2)	N/A
Culex erraticus	5 (16)	0	0
Cx. pipiens group	42 (1,325)	0	**4**
Cx. tarsalis	3 (5)	0	0
Cx. territans	3 (3)	0	0
Culiseta inornata	0	1 (1)	N/A

[a]Mosquito yields displayed as pools (individuals)