An Assessment of West Nile Virus and Mosquito Prevalence in the DuPage County Forest Preserve

Katie Reget, Kelly Burgner, Krystal Caha and Helena Puche, PhD.
CIRRRIS Scholars Program-DePaul University and Harold Washington College

INTRODUCTION
West Nile Virus (WNV) is an arthropod-borne illness affecting individuals globally. The first human case of WNV was determined in the West Nile district of Uganda in 1957. Following the first human case, the first major outbreak occurred twenty years later in Israel. Since the first outbreak, the virus has propagated itself, spreading to every continent in the world. In 2001, West Nile Virus first appeared in Illinois. West Nile Virus is carried by more than 30 species of mosquitoes. The virus is housed within the salivary glands and transmitted via a mosquito bite. As such, the virus is a strong example of zoonosis, a disease transferred from one host to another. Typically, the virus is acquired from a mosquito bite. However, the virus can also be contracted from blood transfusions, organ transplants, and breast feeding.

The vast majority (70%-80%) of individuals infected with WNV are asymptomatic. Only 20% of individuals display minor symptoms including headaches, body aches, or a rash. Less than 1% of individuals have major symptoms consisting of encephalitis or meningitis. Though a serious illness, West Nile Virus is rarely fatal. Of the 1% of individuals who present with major symptoms, 10% die. Diagnosis can be made by looking for the presence of WNV-specific IgM antibodies. This is done on a sample of cerebrospinal fluid taken through a spinal tap. There is no vaccination or treatment for WNV, ultimately making the illness detrimental to countless regions globally.

METHOD
Mosquito Trap Construction
The mosquito trap consists of a large (roughly 5 gallon) basin that is filled with 2 gallons of water, grass clippings, and larrvicide. A PVC pipe in anchored half an inch from the surface of the water. Within the PVC pipe, a small motorized fan runs in reverse such that air is sucked into a mesh net. The mosquito is sucked into the trap and eventually dies. Diagnoses can be done on a sample of cerebrospinal fluid taken through a spinal tap. There is no vaccination or treatment for WNV, ultimately making the illness detrimental to countless regions globally.

Mosquito Genera
Mosquitoes were identified based on two common genera typically abundant in the woodlands of the Midwest. The genera are the Culex mosquito and the Anopheles (Asian Tiger) mosquito. Other species of insects were identified in the traps. These insects were identified and recorded and contributed to the diversity calculations.

West Nile Virus Testing
Mosquitoes were tested for WNV using the VecTOR Test developed by VectorTest Systems. Fifty mosquitoes were separated into a test tube according to genera. A 2.5 mL sample of grinding solution was suspended into the test tubes. The tubes were then placed in a variable for two minutes at a level five speed. Using a micro pipette, a 250 µL sample of solution was acquired and placed in separate conical tubes. The conical tubes were centrifuged at 12,000 rpm for three minutes. The conical tubes were removed and virus test strips were inserted into each tube. After a fifteen minute waiting period, the results were ready to be analyzed. Using the "sandwich principle" the strips were identified as positive or negative.

RESULTS

Fig. 1: A satellite view of all four trap locations: Blackwell 1, Blackwell 2, Herrick Lake North, and Herrick Lake South.

Figure 2: The closer a trap is to water, the more mosquitoes were collected.

Figure 3: The number of mosquitoes collected from each location in relation to water vicinity. Water vicinity includes all lakes, ponds, swamps, etc.

CONCLUSION
The West Nile Virus testing on mosquito colonies in the DuPage County Forest Preserve was negative. Any results are positive. A satellite view of all four trap locations: Blackwell 1, Blackwell 2, Herrick Lake North, and Herrick Lake South. As the trap is closer to water, the higher the mosquito density. The density was highest at Herrick Lake North, a roadside trap located approximately 17.96 m from a body of water. There was no connection between the location of the trap and the presence of West Nile Virus. All results of the West Nile Virus testing were negative. 2,316 mosquitoes were tested.

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LITERATURE CITED
- 9Mosquito larval population in proximity to mosquito testing traps.