

West Nile Virus Monitoring Update



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April 2010

Background

For several years, the Forest Preserve District of DuPage County had used contractors to monitor general mosquito populations. In 2002, however, West Nile virus hit Illinois hard with 884 human cases and 66 deaths; 52 cases and three deaths were in DuPage County alone (IDPH 2002). The virus also severely affected many bird populations, including American crows and blue jays. As a result, in 2003 the District started a new program to protect public health by monitoring and reducing breeding sites of the *Culex* species of mosquito, a prime transmitter of West Nile virus.



Culex pipiens female mosquito laying eggs

Susan Ellis, Bugwood.org

From late May to the first hard frost in October, full-time interns, under the supervision of the Forest Preserve District's Office of Natural Resources, monitor marshes and pools for *Culex*. They identify and count larvae, and if *Culex* are present, they distribute a biologically derived larvicide to suppress the population. They also trap adult *Culex* mosquitoes and test them for West Nile virus. If a positive test occurs, the Forest Preserve District notifies local and state public health departments and surveys breeding sites near the trap. If *Culex* are found at these trap sites, the District distributes the aforementioned larvicide as well.

2009 Program Changes

The Office of Natural Resources changed the program in 2009 to operate more efficiently while continuing to protect public health. The District eliminated sites that historically did not produce *Culex* mosquitoes and that had been dry during the majority of monitoring efforts. In addition, interns visited sites every 10 days instead of weekly. As a result, the District needed fewer interns to efficiently manage sites that consistently produced *Culex* or positive West Nile virus results.

2009 Results

In 2009, the Forest Preserve District monitored 130 larval sites and 43 adult trapping sites. Interns administered 436 West Nile virus tests; none were positive. The DuPage County Health Department reported 55 positive samples in other parts of the county, a drastic decrease compared to 2006, when the county had 417 positive samples. In 2009, five human cases of West Nile virus were reported statewide with no deaths; no human cases of West Nile virus were in DuPage.

West Nile Virus Monitoring Update

Conclusions

The extremely low presence of West Nile virus in 2009 was partly a result of cold temperatures in early April. Some overwintering *Culex* mosquitoes that emerged from sewers and catch basins in March may have died when temperatures hit 32° F on April 7, 2009. This may have limited the amount of West Nile virus that was spread from birds to mosquitoes in the early part of the season. However, because many mosquitoes had not yet emerged by the beginning of April, these conditions may have caused only a partial delay in *Culex* development.



Setting up a "gravid" adult mosquito trap

The other big weather story last year was in July, when temperatures averaged only 78° F. This low average and frequent rains, which washed out breeding sites and provided less than ideal conditions for *Culex* breeding, could explain why the presence of West Nile virus was low. Scientists suspect that the transmission of this virus is enhanced during periods of hot and dry conditions accompanied by periodic rain (Lampman 2005). On average, Illinois has 19 days at or above 90° F (Haramis pers. comm. 2009). In 2009, only four days were above 90° F.

Scientists speculate that these conditions may have caused the reduction of incidences of West Nile virus in 2009 and that another season of hot and dry temperatures similar to 2002 and 2005 are ideal for a resurgence of West Nile virus in this area.

Why Continue the Program

Many citizens have asked whether the Forest Preserve District should continue its monitoring program when West Nile virus seems to be waning. Here are some reasons why it is important.

- Weather patterns change quickly, and northeastern Illinois has experienced abnormal summer weather for the past three years. Because weather drives the level of West Nile virus infections, this area could be one hot, dry summer away from another outbreak.
- Consistent, yearly, detailed monitoring data is at the heart of any good integrated pest-management program. Using insecticides without this data is dangerous and ecologically unsound.
- Emergency treatments are typically reactionary, expensive, less selective and less effective at reducing public health risks. Without an integrated pest-management program that includes monitoring, emergency treatments can become more frequent.



West Nile Virus Monitoring Update

- Mosquito breeding habitats fluctuate regularly. A site may be very productive for *Culex* one year and not another. A lack of monitoring data prevents ecologists from targeting problem sites in a given season.
- Blanketing historical problem sites with insecticides in the absence of monitoring data increases the risk of developing insects that are resistant to environmentally benign insecticides and could force the District to use stronger and less selective insecticides in the future.
- Having an integrated pest-management program may help the District react quickly if another life-threatening mosquito-borne illness is found in Illinois.

Future Direction

For the reasons stated above, the Office of Natural Resources has recommended that the District keep its West Nile virus and mosquito monitoring program until ecologists can determine that the threat to public health is reduced to a low level. This might occur if local and regional health departments discontinue their programs or submit formal recommendations that the District scale back its efforts, recommendations that would likely only occur if the area experiences a hot summer with a low presence of West Nile virus. This might also occur if research confirms that West Nile virus has mutated into one that is not infective or transmissible to humans. In any case, staying connected and informed with current research through scientific literature and professional conferences will be important to cultivate future understanding.

References

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