MOSQUITO LIFE CYCLE

The life cycle of a mosquito involves four stages: egg, larval, pupal, and adult.

Eggs are laid by female mosquitoes as single eggs or in rafts, and can be deposited on various materials (damp soils, sides of containers, surface of water).

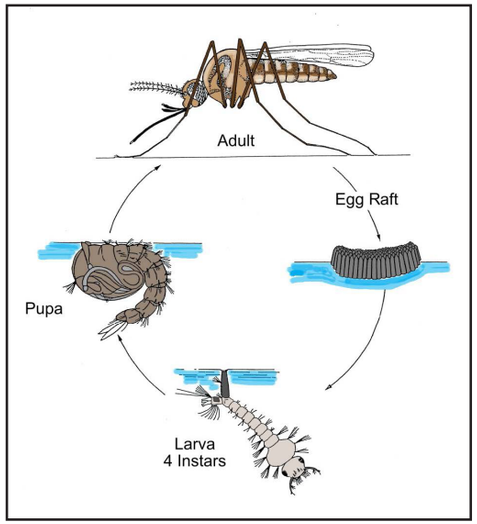
Once the eggs hatch in water mosquito larvae will develop in four instar stages. This process can take a few days to several weeks depending on the habitat and temperature.

The larvae develop into pupae, and this stage of development will last a few days. From the pupal stage, adult mosquitoes will emerge from their aquatic habitats.

Male mosquitoes will emerge first, with females following a few days later. After mating occurs, female mosquitoes typically will obtain a blood meal, which provides protein to complete the development of eggs. Three to four days after taking a blood meal, the female mosquito will deposit a new batch of eggs, of which will then hatch into a new generation of mosquitoes.

Some species of mosquitoes will produce multiple generations of eggs per year, while others will only produce a single generation.

CULEX PIPIENS LIFE CYCLE



MOSQUITO REPELLENTS

Insect (and tick) repellents applied to skin and/or clothing can be broadly grouped as synthetic-chemical or botanical chemical-based compounds. There are about 150 repellent products registered with the U.S. Environmental Protection Agency (EPA) for use on human skin.

The primary active ingredient in most insect/tick repellents is DEET (N,N-diethyl-m-toluamide). The concentration of the active ingredient determines the length of time of protection against mosquito bites. When applied according to label instructions, DEET concentrations less than 10% provide 2-3 hours of protection, while a 30% concentration may provide up to 8 hours of protection.

Other repellents and appropriate concentrations for use against mosquitoes include: Picaridin (20%), Oil of Lemon Eucalyptus (30%), IR3535 (20%), and 2-undecanone (7.75%)

Botanical, herbal or natural-based repellents that include one or several plant essential oils, may provide short term protection at best.

For use only on clothing, products with permethrin, a pyrethroid insecticide, work primarily by killing mosquitoes upon contact with treated clothes, although it also has some repellent activity. Available as an aerosol spray or pre-treated clothing, it can provide a high level of protection against mosquitoes and ticks.

Always read, understand, and follow the label instructions!

Four D's for Prevention

1. **Defend:** use an EPA registered mosquito repellent (DEET, picaridin, Oil of Lemon Eucalyptus, IR3535, or 2-undecanone)
2. **Dress:** wear light colored clothing with long sleeves, socks, and pants to minimize mosquito bites
3. **Dusk/Dawn:** avoid areas where mosquitoes are active from one hour before sunset to one hour after sunrise
4. **Drain/Dump:** check around the home for containers or areas which hold water. Dump out once per week

Further information on mosquito biology, mosquito-bite prevention and environmental mosquito control is available from the CT Mosquito Management Program.

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State of Connecticut Mosquito Trapping and Arbovirus Surveillance Program

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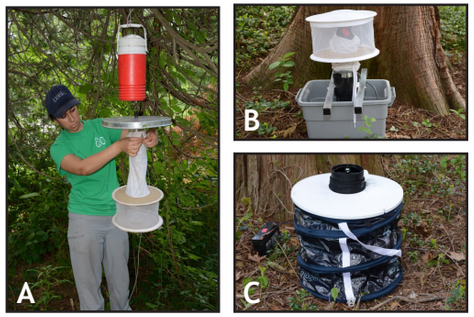


MOSQUITO TRAPPING

Mosquitoes are collected annually from 108 fixed sites located in 88 towns in Connecticut from the beginning of June though late October. At all trap sites, a CDC miniature light trap (A), baited with carbon dioxide is used to collect mosquitoes seeking a blood-meal. Additionally at each site, a CDC Gravid trap (B), baited with a hay infusion is used to collect *Culex pipiens* and *Cx. restuans* mosquitoes. Gravid traps are highly effective in collecting WNV-infected *Cx. pipiens*. BG Sentinel traps (C) are used at selected trap sites to evaluate the relative abundance of the invasive species, *Aedes albopictus* ("Asian Tiger Mosquito"). Traps are initially set on a rotational basis at each site about once every 10 days. If WNV or EEE virus is identified in a mosquito sample, trapping frequency is increased to once or twice per week, to better evaluate the risk of human exposure to either of these viruses.

MOSQUITO TESTING

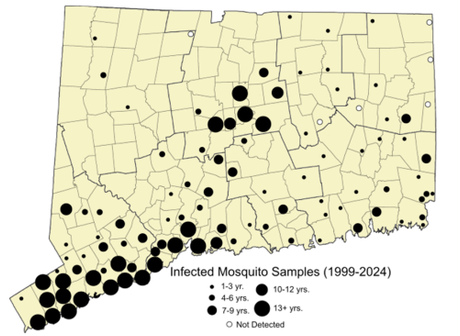
Collected female mosquitoes are identified to species and submitted for virus testing according to date, site, trap type, and species, in groups of 1 to 50 individuals. Connecticut is one of a few states which will test all female mosquito species collected for arboviruses. Each sample is screened using a cell culture assay, and virus identification is performed using molecular biology techniques. Our testing program will detect all mosquito-borne viruses found in CT. Additionally, the methods used can detect an introduced or exotic mosquito-borne virus, such as Zika or Chikungunya virus.

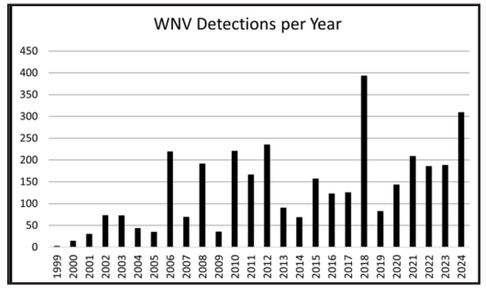
WEST NILE VIRUS

West Nile virus (WNV) has become the main cause of mosquito-borne illness in the U.S. since its introduction into North America in 1999. WNV is maintained in a bird-mosquito transmission cycle. Humans and horses can become infected when mosquitoes feed on infected birds and then mammals.

Culex pipiens is the main mosquito vector of WNV in the northeastern U.S. Larvae are most abundant in urban and suburban habitats, developing in water that collects in roadside ditches, catch basins, and artificial containers such as tires.

The majority of WNV activity is associated with urban and suburban communities of Fairfield, New Haven, and Hartford counties. The greatest risk of human infection occurs from July-September, closely following the emergence of WNV positive mosquitoes. **An average of 6-8 reported human cases of WNV occur each year.** Human infections range from no symptoms to a flu-like illness to life-threatening neuroinvasive disease. About 10% of people developing severe disease die from the infection. People ages 50+ are at greater risk for severe disease.



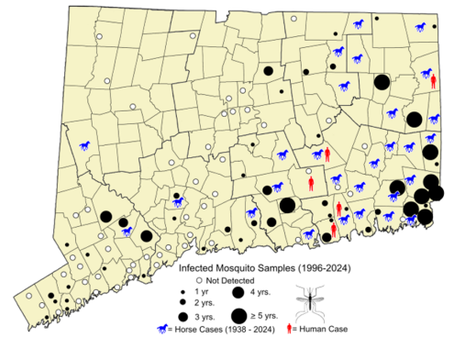


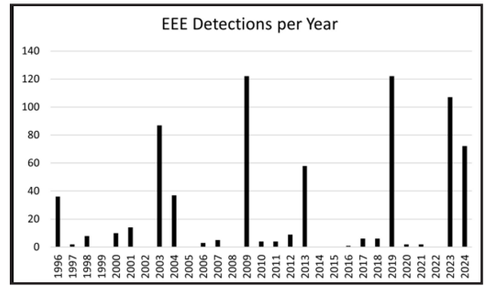
EASTERN EQUINE ENCEPHALITIS

Eastern Equine Encephalitis (EEE) virus is a rare but highly pathogenic mosquito-borne disease. The human fatality rate for EEE is 40%. Approximately half of survivors suffer from long-term neurological damage. **To date, there have been 5 confirmed human cases of EEE in CT**. Symptoms include fever, headache, anorexia, vomiting, diarrhea, convulsions, and coma. The virus also causes high mortality in horses and exotic birds (pheasants and emu).

Culiseta melanura is the main mosquito vector of EEE in the northeastern U.S. and is most abundant in Atlantic white cedar and red maple swamps. The larvae develop in the water that is found in underground crypts, formed by the root masses of trees native to these habitats. EEE virus is maintained in a bird-mosquito transmission cycle. Transmission to humans and horses occurs when mosquitoes feed opportunistically on infected birds and then mammals.

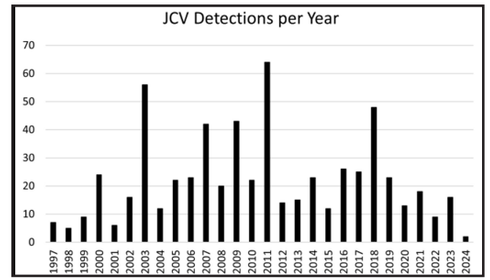
EEE virus transmission is unpredictable and varies from year to year. The highest levels of virus activity in mosquitoes occur in rural communities in southeastern CT.





JAMESTOWN CANYON VIRUS

Jamestown Canyon virus (JCV) circulates in a transmission cycle involving mammalian-biting mosquitoes and white-tailed deer hosts. Human cases are rare but are increasing in the northeastern and northcentral US. **To date, there have been 2 confirmed human cases of JCV in CT.** Most human infections are asymptomatic but some individuals may develop neurological illness, including meningitis and encephalitis. The virus re-emerges every summer in Connecticut and occurs throughout the state.



LA CROSSE VIRUS

La Crosse virus (LACV) occurs in the eastern US with most human cases occurring in the Midwestern and Appalachian regions of the country. Most infections are asymptomatic or mild and severe disease (encephalitis) afflicts mainly children. **To date, there have been no confirmed human cases of LACV in CT.** The virus is maintained in a transmission cycle involving the eastern tree-hole mosquito *(Aedes triseriatus)* and the eastern chipmunk. Virus may also be passed from female mosquitoes to their progeny.

MOSQUITO-BORNE VIRUS TRANSMISSION CYCLE