

Introduction:

Mosquito surveys on Cape Cod started in 1928; this report summarizes the last 10 years of observation in Atlantic White Cedar (AWC) habitats. Data are being organized in an all-taxon AWC range wide biodiversity queryable database and website under development as part of the Universal Indexer and Organizer (UIO) in the Information Systems Division, Marine Biological Laboratory, Woods Hole, MA. The completed linked databases are designed to document biodiversity of all taxa in all AWC wetlands across their entire range.

Taxonomy:

All mosquitoes are in the Order Diptera, Family Culicidae; they undergo complete metamorphosis: egg, larva, pupa, adult. Eggs are deposited singly or in rafts on the water surface and hatch within a few days, or in moist ground depressions, and may remain dormant for months. Larvae feed on algae, small aquatic animals and detrital particles collected by mouth brushes; some species scrape submerged substrates for attached microorganism. All larvae in AWC wetlands rise to the surface for oxygen, which enters via spiracles on the dorsal siphon. Quiescent, non-feeding pupae usually float at the waters surface. When disturbed, the pupa tumbles down as the abdomen rapidly flexes. Adult females of most species require blood protein for egg production; as hosts for many pathogens, they often serve as disease vectors.

Methods:

Mosquito collection:

Adults: Adult mosquito populations were monitored weekly at 5 sites (*see* map) June through August using Encephalitis Vector Survey light traps (Bioquip, Gardena, CA) baited with CO₂. An insulated bucket filled with 3 lbs. of dry ice was hung from a tree branch not higher than 2 m off the ground. The trap itself was suspended from the bottom of the bucket. As the dry ice sublimates, the CO₂ acts as an attractant to most mosquito species. These traps are effective for monitoring mammal-biting mosquito populations; light traps were run for a 24-hour period. Resting boxes were also used to monitor adult *Culiseta sp.* populations. In June, six boxes were placed at each study site. Mosquitoes found resting in these boxes were collected on a weekly basis through October.

Larvae: Larval surveys were conducted once each month April through October. Field crews, using a standard 350 ml dipper, sampled water from a minimum of 20 locations in each cedar swamp.

Field treatment, Laboratory protocol:

A liquid larvicide was used to control mosquito populations. The active ingredient is *Bacillus thuringiensis* var. *israelensis*, commonly known as Bti. Maps of sample sites are filed in a GIS database. Adult mosquitoes were identified to species, then placed in vials in a 00 C freezer. Larvae were also identified to species. Collections of potential vector species were pooled by site and date then sent to the Massachusetts Department of Public Health for identification of any pathogens being carried by the mosquitoes.

Results:

We have documented 24 freshwater species, 2 saltwater species, and one brackish species in Barnstable County. Of these, 13 species in 5 genera have been found in these cedar swamps. *Culiseta melanura*, which prefer to obtain blood from birds and are documented as the enzootic vector for Eastern Equine Encephalitis (EEE) have been found at all sampled sites. Mosquitoes on Cape Cod have tested positive for West Nile Virus (WNV) and EEE. To date, there has been one confirmed human case of WNV and no human cases of EEE in Barnstable County. Locations harboring each species, potential diseases carried, primary hosts, and months during which adults are active in this region are indicated in Table 1.

References:

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- Turell, M.J., M.L. O'Guinn, D.J. Dohm and J. Jones. 2001. Vector competence of North American mosquitoes (Diptera:Culididae) for West Nile Virus. J. Med. Entomol. 38(2): 130-134.
- University of Massachusetts, Coop. Ext. Service. Mass. Study manual supplement for mosquito pest control: category #7.
- Mosquito species found positive for WNV as reported by state surveillance programs to ArboNet as of 12/03/02. (<http://www.cdc.gov/ncidod/dvbid/westnile/mosquitoSpecies.htm>)