2011Vector Control Cherry Grove Information

Over 75 species of mosquites have been observed in our region of which 15 species impact the quality of life or are disease vectors. Fire Island has about 50 species/ genera:Anopheles, Culex, Uranotaenia and Culiseta are our problem

Mosquito Life Cycle: Egg (some dry or wet,hatch quick and can be stuck to a surface that will get water)to Larva (four stages,min of 4-5 days in this form, feed constantly) to pupa(one to two days, do not feed) to adult. Males last a few days. Do not feed on humans and have short flight ranges. Females bite us, can lay eggs every 3 days , live as long as a month and can fly miles (2-6 miles) for feeds. Mosquitoes do not breed in moving water or water that is deeper than 3 feet. Surveillance is through dip count (larva), traps (NJ-light CO2, CDC Light-frozen dry ice CO2, bite counts and complaints. Mosquitoes are vectors of disease through the secretions they use to prevent blood from clotting and make the target less aware of a bite and the feeding process.

FI Diseases of Concern: Eastern Equine Encephalitis EEE/ West Nile Virus WNV

Diseases reside in birds and mammals and are spread among these species by mosquitoes that favor them as meals. As these critters become more infected and mosquito population numbers increase, the risk of a bridge mosquitoe (species that usually favors humans but will feed on these species secondarily)occurring increases. This will spread the disease to humans who then become the reservior for a human epidemic. NYS guidelines recommend the implementation or intensification of adulticiding at the highest risk category when an "outbreak is in progress" defined as multiple confirmed cases of WMV in humans and conditions favoring continued transmissions to humans. The department of health will order the fogging to occur in the affected areas to contain and control the risk of further spread.

Management:

Source reduction -Water management 70% of total Suffolk County vector control operation, empty plant dish 2x/wk, drill holes in lids and bottoms of trash cans, remove debris from property where water can collect, inspect tarps for water pockets, ditches for water flooding areas, dams for areas where eggs need period of dryness to trive.

-Biological organisms: predators (birds, bats,fish &insects),bacteria(Bti/Bs)

-Pesticides: organphoshates, Pyrethrins/Pyrethroids, Synergist

This is a summary of products that are presently in use in Cherry Grove as well as what would be used for spraying.

Bacterial strains

The Dunks you can buy at hardware stores contain the bacterial pesticide **Bti** (Bacillus thuringiensis var. israelensis) that is highly specific to mosquito larvae and is an environmentally friendly product. The larvae ingest the Bti particles, which attack the gut lining of the mosquitoes stomach, resulting in the death of the mosquito. This pesticide, although effective when applied properly, has several drawbacks to its widespread use. Bti must be applied to larvae in the first or second larval stage, which only last a few days, and must be applied to standing water. Bti is relatively expensive to purchase and to apply, and must be reapplied often to continue effective treatment. In addition, only certain mosquito species can be treated with Bti effectively. Its biggest benefit to us is that it can be used to treat mosquito larvae in many environmentally sensitive areas

SCVC currently applies **Vectolex,** another bacterial pesticide with live Bacillus sphaericus as its active ingredient, in our larval control program. Bacillus sphaericus is designed to be applied by ground (by hand or truck-mounted blower) or aerially at rates of five to 10 lbs. per ac. Best results are obtained when applications are made to larvae in the first to third instars. Use of the highest rate is recommended for dense larval populations. Larval mortality may be observed as soon as a few hours after ingestion but typically takes as long as two to three days, depending upon dosage and ambient temperature. Vectolex is most effective against only certain mosquito species, but, unlike Bti, it is a true biological control agent. That is, Vectolex introduces a live bacterium into the mosquito-breeding site, and this bacterium can recycle and maintain itself in the field. As a result, Vectolex can be effective against mosquito larvae for several weeks after application, if conditions are favorable. It has no long term environmental or human effects. This product provides a form of cost-effective, long-term control in areas that continually hold water and breed mosquitoes, such as low land areas that frequently flood, drainage ditches and catch basins.
EPA Factsheet available at http://www.epa.gov/oppbppd1/biopesticides/ingredients/factsheets/factsheet_128128.htm#humanhealth

Bio Pros- reduce chemical inputs to environment, little or no effect on beneficial and non-targeted organism, possible establishing of biologicals to permanently reduce mosquito population& organisms may be part of ecosystem and only require augmentation to reduce pest population.

Bio Cons- target only a few species at a time, cost more, need trained professional to assess conditions and are more difficult to use effectively than pesticides.

Pesticides/Adulticide

If surveillance and larval efforts fail to stop a brood of mosquitoes, the larvae will pupate and soon emerge as adults. Adult mosquitoes can travel 2-8 miles a day, so treatment is extremely difficult at this stage. Local infestations can be managed using hand held or truck mounted sprayers. While adult control involves use of more broad-spectrum pesticides over a wider area than those used for larval control, adverse effects can be minimized by limiting droplet size and timing of application. Adult mosquito control in Cherry Grove (CG) would be accomplished using applications of Ultra-Low-Volume (ULV) aerosols of pesticide. Anvil (Sumithrin) is the pesticide that would be use that rapidly degrade in the environment.

Anvil is a first generation synthetic analogue of natural pyrethrins mixed with piperonly butoxide PBO 1:5 mix, 0.04 oz/acre: 0.2 oz/acre. Natural pyrethrins (pyrethrum) are extracted from chrysanthemum flower heads, mainly Chrysanthemum cinerarnaefolium, grown commercially in parts of Africa and Asia. The six pyrethrins are esters of three cyclopentenolone alcohols: pyrethrolone, cinerolone, and jasmolone with either chrysanthemic acid or pyrethric acid. Synthetic analogues, referred to as pyrethroids, of the natural pyrethrins were first marketed in the 1950s. As with the natural pyrethrins, Anvil is relatively unstable in light. Pyrethroids exhibit rapid knockdown and kill of adult mosquitoes, characteristics that are considered a major benefit of their use. The mode of action of these compounds relates to their ability to affect sodium-channel function in the neuronal membranes, and so they do not affect cholinterase

ULV application involves using hand held devices (cold aerosol generators) that deliver a small dose of pesticide (about 4 ozs of Anvil for all of CG) as an aerosol consisting of particles in order to kill the mosquitoes in the air. Cold aerosol generators, or cold foggers, were developed to eliminate the need for great quantities of petroleum oil diluents necessary for thermal (hot/smoke)fogging. These units originally were constructed by mounting a modified nozzle on a thermal fogger's forced air blower (Russel, 2001). The insecticide is applied full strength, or in moderately high concentrations, as is common with the pyrethroids. This translates into very small quantities applied per acre and is, therefore, referred to as ULV. Mosquito control ground adulticiding operations rarely exceed one oz./acre. The optimum size droplet for mosquito control with cold aerosols applied at ground level has been determined to be in the range of five to 15 microns (Rutgers, 2004). Additional insect species most susceptible to harm are bees. Larger species(butterflies, wasp, dragonflies, etc.) may also be impacted if they come in contact with the droplets but are less likely to because of the decreased amount of dose delivered by ULV and timing of application. By applying adulticides using ULV techniques and during times of peak mosquito activity (early morning and late evening) and not other insect species activity(butterflies/ bees), adult mosquitoes can be controlled with minimal adverse effects to other insect species and the environment. Anvil is also toxic to fish. Multiple studies are on the internet regarding this product in regards to potential effects on animals and humans. All of the studies employ either routes of administration or doses that are hundreds to thousands times higher than what would be used in Cherry Grove. Birds are not affected either directly(toxicity) or indirectly (mosquitoes are not primary nutrition source). Humans carry enzymes that can detoxify doses contained in the micron particles liberated as aerosol.

Adulticide Pros: Decrease nuisance mosquito population (this does not correlate with decrease in bites), decrease risk of developing bridge mosquite that will bring EEE and WNV to humans

Adulticide Cons: Non-target potential effect, involves chemicals that are synthetic, possible ecobalance affect

EPA fact sheet on **Review of the Relationship between Pyrethrins, Pyrethroid Exposure and Asthma and Allergies-** http://www.epa.gov/oppsrrd1/reevaluation/paw-factsheet.html

EPA reregistration information of d-Phenotrin(Sumitrin) 2008 http://www.epa.gov/oppsrrd1/reregistration/REDs/sumithrin_(d-phenothrin)_red.pdf

Toxicity review: http://www.suffolkcountyny.gov/health/suffolkvectorplan/pdf/t3-b6p1ToxReview.pdf

For additional information on the products we use, the US Environmental Protection Agency has put together several fact sheets on pesticides used in mosquito control. http://www.epa.gov/pesticides/about/index.htm#balance

There is a no spray directory that homeowners must sign up for annually. This restrict nuisance spraying on your property and for 150 feet on either side of your property.

No Spray Information:
http://www.suffolkcountyny.gov/departments/publicworks/Mosquito%20Control/Active%20Web%20Pages/No%20Spray%20Law%20Registry.aspx

No Spray Form: http://www.suffolkcountyny.gov/upload/publicworks/pdfs/dns%20request%20form%202008.pdf