

March

2013

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Program Plan

Spring Campaign

Larviciding to control spring *Aedes* mosquitoes is an annual project that typically takes place in mid-April.

Spring larviciding controls *Aedes* mosquito larvae in woodlots using *Bacillus thuringiensis israelensis* (*Bti*) to prevent them from emerging as biting adults. *Bti* kills 1st-3rd instar larvae, but does not adversely affect other wildlife or beneficial insects, people or pets.

Aerial and ground applications will be timed to best impact larvae. 2013 will see some changes to the aerial program. Namely, there will be no helicopter application as in previous years of the program. Instead, all aerial application will be completed by the fixed wing applicator, Earl's Spray Service of Breckenridge.

Woodland acreage treated by air will decrease this year to about 40,000 acres, due to rising costs; dosage rates will remain the same at 4 pounds of *Bti* per acre. Treatment will occur after extensive surveillance has taken place.

The following is a list of aerial program components: 40 woodlots monitored, 300 acres treated by ground crews, 1 loading zone for aircraft at Barstow Airport in Midland, aircraft calibration, 3 aircraft, quality control to monitor aerial application.

Woodlots are monitored both before and after application to monitor treatment efficacy through pre- and post-larval counts. The dip counts are taken in both treated and untreated (control) woodlots.



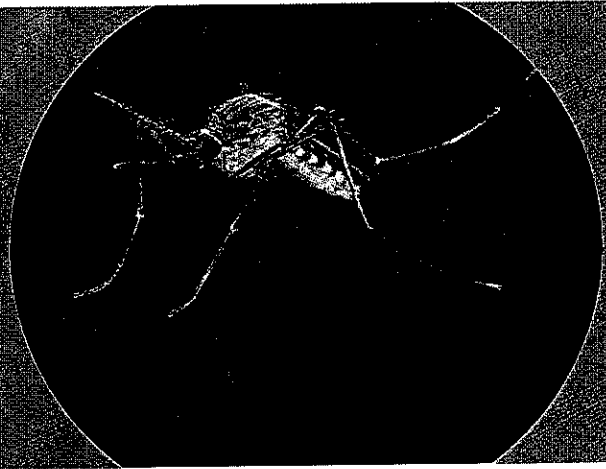
Technician Ryan Krager monitors mosquito larvae before any treatment is performed

HIGHLIGHTS

- Spring aerial application at 4 #/acre
- Aerial acres treated—40,000
- Spring woodlots treated with fixed wing only
- 3 aircraft for spring program
- Apply for scrap tire grant through MDEQ
- Hire 27 seasonal employees
- Treat catch basins in city with VectoLex; outlying basins treated with Natular XRT
- Use Evoluer 4-4 adulticide
- Field trial with electric ULV machine
- Follow NPDES annual report requirements
- 10-year anniversary of new BCMC facility—open house

4 TIPS

Four ways to protect yourself against mosquitoes



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Summer Larviciding: Why It's Important

Larviciding is the act of controlling immature mosquitoes in water habitats where they're found before they become winged adults. Approximately 70% of mosquito control efforts are directed toward the immature stages.



Larviciding involves the introduction of control materials into aquatic habitats to control larvae or pupae and prevent adult emergence. Habitats with a previous history of breeding will be investigated, with additional emphasis on mapping new sites. We expect to survey nearly 20,000 sites, treating about 15%. Emphasis will be given to source reduction in the form of dumping water from containers to eliminate larvae. Technicians will respond to service requests phoned in by residents as well as survey known breeding sites or new sites they find during daily monitoring.

Larviciding is the main component of Bay County's control program. There are a number of different

products available to control larvae and pupae, and often times one product will be better-suited for a particular situation than another.

Control materials that are utilized include the microbial products *Bti*, *Bacillus sphaericus*, and Natular (spinosad), as well as temephos and larvicide oils.

Habitats that will be monitored regularly include: catch basins, roadside ditches, abandoned pools, flooded fields and woodlots, retention ponds, sewage lagoons, scrap tires, and artificial containers.



SERVICE REQUESTS

Over 2,500 service requests are logged by office staff and maintained in a database in a typical year.

Service requests are logged into a database and used as one means to monitor mosquito annoyance. Office staff also maintain the long driveway program, wherein residences far enough off the main roadway are fogged in order to provide relief from biting adults.

Medical needs and "no spray" registries are also retained, mapped, and updated as needed. "No spray" residents are asked to place reflective signs at property lines, which serve as indicators that the residence must not be treated.

Pesticide application records, financial accounts, and correspondence are also retained by the office.



COMMUNITY SCRAP TIRE DRIVE

Two scrap tire drives will be held during the 2013 season. Each Bay County residence may recycle ten tires without rims. Tire drives are designed to collect tires from residential

areas thereby targeting mosquitoes using scrap tires as a breeding habitat in urban neighborhoods; businesses are excluded.

Tire drives will be held at the Bay County Fairgrounds where tires will be loaded into semi-trailers then shipped to Environmental Rubber Recycling of Flint. From here, tires are ground

into chips and sent to Michigan power plants to be burned as tire-derived fuel (TDF).

We have applied for a Scrap Tire Cleanup Grant with the Michigan Department of Environmental Quality and are hoping to receive up to \$3,000 to help defray the costs of our 2013 community tire drives.

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Mosquitoes are most active at dawn and dusk. Limit outdoor activities during those times, or take precautions to prevent mosquito bites by using repellent. Repellents containing DEET are a good choice, but remember to always follow label instructions.

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When possible, wear long-sleeved shirts, long pants, and socks when outdoors. Mosquitoes can bite through clothing, however, so it's a good idea to also spray repellent directly onto your clothes.

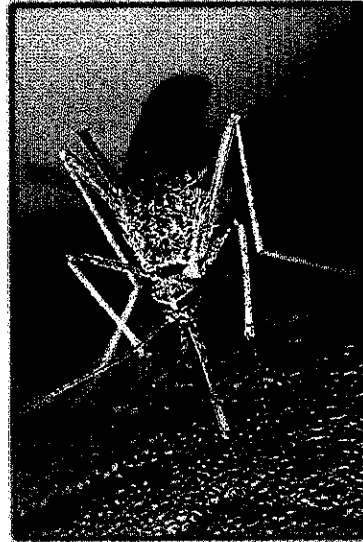
4

Install or repair screens. Some mosquitoes like to come indoors, so keep them outside by having well-fitting screens on both windows and doors.

standing water on your yard so mosquitoes won't breed. Common habitats include tires, cans, flower pots, barrels, toys, buck-clogged rain gutters. Getting rid of water, and these habitats, can be reduced.

Adulticiding

Protecting public health by managing mosquito populations is Bay County Mosquito Control's primary goal. By controlling mosquitoes, we will reduce the number of adult mosquitoes and thereby reduce their nuisance and disease risk. In order to meet that goal, eight Ultra Low Volume (ULV) truck-mounted spray units will be used with treatment occurring from sunset to 2:00 a.m., provided that mosquito populations are high enough to warrant fogging and that weather conditions are conducive to treatment. Adulticiding involves the use of permethrin to reduce numbers of adult mosquitoes to tolerable levels or to disrupt or end the transmission of disease to humans. Although larviciding is the main thrust of our Integrated Pest Management (IPM) approach, adulticiding is still important because controlling larvae is not 100% effective, mosquitoes can migrate into our district from untreated surrounding areas, and some breeding sites may not be treated.



ALLERGIC REACTION



Many of the mosquito saliva proteins can cause immune reactions, including allergic reactions.

Only the female mosquito feeds on humans because she needs a blood meal to produce eggs. During a feeding, the female mosquito bites the skin, and injects saliva. The saliva contains proteins that prevent the blood from clotting and keep it flowing into her mouth; however, the saliva also potentially contains disease agents such as dog heartworm microfilariae, malarial parasites, and viruses (such as West Nile).

People have a range of reactions to mosquito bites, but most people have immediate swelling and itching around the bite area, experiencing the typical itchy red bump. Some people, however, have more severe reactions, but that is less common.



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of education

Don't forget the value of public education in mosquito control.

A. Mosquito control programs need the support of an informed public so staff members make presentations to local clubs and special interest groups on request. Presentations are also given to township and county officials so they're aware of program standards or any planned changes.

B. Bay County Mosquito Control has developed its own literature to inform citizens how they can assist in controlling mosquitoes, especially in backyard habitats. Literature may be distributed as door hangers, flyers, bookmarks, rack cards, or brochures.

C. Educational activities that focus on K-6 school programs are carried out throughout the year. With children, the focus is on mosquito biology where students learn about the life cycle of mosquitoes and habitats where immature stages can be found. We teach them the value of the program in relation to both nuisance and disease-carrying species.

Mosquito Tracking

The foundation of a quality mosquito control program is having an understanding of the biology of the local mosquito species. Tracking both mosquito larvae and adult populations as well as disease are part of the Biology Department's daily operations. Larvae are sampled in woodlots, fields, ditches, pools, sewage lagoons, and retention ponds while adults are collected from mechanical traps. These traps include New Jersey Light Traps, CDC Traps, and Gravid Traps. Data are scientifically collected and analyzed in order to control mosquitoes in the most effective way and reduce disease transmission, while minimizing environmental impacts. Monitoring of

mosquito-transmitted diseases continues each year. Testing mosquitoes and wild birds for the presence of viruses is an important program feature. Dead bird monitoring and testing will continue in 2013 as we maintain screening for West Nile, St. Louis, and Eastern Equine Encephalitis.



Technician Stephanie Herman gathers mosquitoes for disease testing

Biology

INFO

Mosquito Disease Surveillance

COLLECT AND TEST VARIOUS MOSQUITO SPECIES

TESTING FOR WEST NILE, ST. LOUIS, AND EASTERN EQUINE ENCEPHALITIS

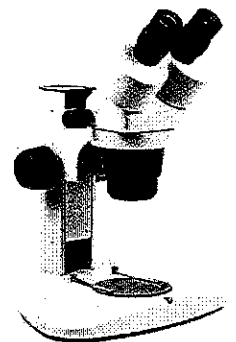
SAMPLES ARE PLACED WITHIN VIALS THAT ARE SENT TO MSU FOR TESTING

RESULTS ARE CONVEYED VIA E-MAIL

POSITIVE SAMPLES REQUIRE AN IMMEDIATE SURVEILLANCE AND CONTROL RESPONSE

Larval Sampling/Identification

Larval surveillance is important in determining the abundance of mosquito larvae in various habitats. The information can be used to determine optimal times for using larval control materials and to determine the need and timing for adult mosquito control. Crews collect larval samples daily that are identified by lab staff. Larvae are identified (with the help of a dissecting scope) to the species level by using a dichotomous key which guides the user as they look at various body characteristics such as number of head hairs, presence of a siphon, etc.



Education and Outreach

Community outreach will continue to be an important part of the program. Educational programs and presentations are designed to raise awareness of the mosquito's habitat and life cycle. Each season we remind homeowner's about ways to reduce backyard larval habitats.

Presentations are given to students and community service groups, while flyers and brochures are hand-distributed or mailed. We will continue to utilize the media with ads and press releases in order to share information about important dates, events, and disease updates.

Source Reduction



Technician Julie Spyhalski dumps water from a tarp

Source reduction is one component of an Integrated Mosquito Management Program. Source reduction is also referred to as sanitary control and refers to the removal or covering of man-made larval habitats such as tires, tarps, boats, etc. It can also mean the draining or filling of larval habitats that are not environmentally sensitive or protected.