

CMMCP AERIAL MOSQUITO LARVAL CONTROL PROGRAM



SPRING 2020

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ABSTRACT

In an effort to control the emergence of spring brood and early summer, mammal-biting mosquitoes in an area, the Central Massachusetts Mosquito Control Project conducted a concentrated aerial larvicide application of *Bacillus thuringiensis israelensis* in the towns of Billerica, Boxborough and Chelmsford. The dates of the larvicide treatment was April 22nd and 23rd 2020. The larvicide was released over an area of approximately two thousand acres of wetland within the three-member communities. Surveys prior to the larvicide drop proved the areas to be overwhelmed with mosquito larva. Post-treatment inspections showed an average reduction in larvae of 93.03% for each surveillance site. The reduction in larvae will decrease the necessity for ultra-low volume adulticiding during the early summer months.

OBJECTIVE

Each spring the beginning of our mosquito control season is marked by our aerial larviciding of seasonally flooded wetlands. The melting of spring snows combined with the heavy spring rains have led to recharged wetlands and woodland pools. These wetlands and woodland pools provide an excellent environment for the development of early summer, mammal-biting mosquitoes. The species of mosquitoes which are the emphasis of attention for this aerial spraying are *Ochlerotatus excrucians* and *Ochlerotatus abseratus*, both mammal-biting mosquitoes. We also focus on *Ochlerotatus canadensis* which is known to be a vector for West Nile virus and Eastern Equine Encephalitis (Andreadis 2005). By reducing the

population size of these mosquito species, the necessity for adulticide spraying later in the season is lessened to remove the potential disease vectors from our environment.

MATERIALS AND METHODS

In order to assess the effectiveness of the aerial larvicide spraying, the Commonwealth of Massachusetts employs the Generic Environmental Impact Report (GEIR). Recoverable Dip Stations (RDS) are established with one RDS set for every 250 acres to be treated. One untreated RDS is set for each town to be used as a control site. Each RDS has ten flagged dip sites. Each of the dip sites are sampled for larvae, the juvenile form of the mosquito, prior to the treatment. Post-treatment surveys were done to make

comparisons. Larval density changes among these observations form the basis for determining the level of control for the aerial larvicide program. Sampled larvae are always returned to ensure that the treatment and control observations are not artificially impacted. CMMCP personnel identified the areas where the aerial drops would have the greatest impact. In addition, per 333CMR 13.04 (7)(a) a legal notification of the aerial larvicide was placed in The Boston Globe on February 6, 2020 (see appendix 1), and was posted on the CMMCP website (https://www.cmmcp.org/sites/g/files/vyhlif2966/f/uploads/2020_aerial_legal_ad_0.pdf).

CMMCP uses the OMRI certified (see appendix 2) organic larvicide Aquabac 200G® (EPA Reg. No. 62637-3). Aquabac 200G® contains the bacterium *Bacillus thuringiensis israelensis* (Bti). Bti is a biological or a naturally occurring bacterium found in soils. It contains spores that produce toxins that specifically target and only affect the larvae of the mosquito. The mosquitoes ingest the toxins which breakdown the cells of the digestive system. This leads to the demise of the mosquito. Bti has no toxicity to people, so it can be applied safely to mosquito habitat without a detrimental impact on food crops or water supplies (Environmental Protection Agency 2016).

The dates of the aerial treatment were April 22nd for the member towns of Billerica and Chelmsford, with Warren Farm in Chelmsford, MA being used as the loading area. Boxborough was treated on April 23rd. MinuteMan Airfield

in Stow, MA was used as the staging area. The dates were chosen to coincide when the larvae are most actively eating and thus make the greatest impact on the population of mosquitoes. It is also done now to deliver the bacteria to the targets before the leaves and canopy has developed.

North Fork Helicopter (Cutchogue, New York) was contracted to apply the larvicide to 868 acres in Boxborough, 744 acres in Billerica and 526 acres in Chelmsford for a total of 2138 acres. The rate at which the larvicide was applied was five pounds per acre. CMMCP has found this rate Aquabac 200g® has provided proper control in these areas.

Following the application of the Aquabac 200G®, the CMMCP crews return to the flagged sites after 24 and 48 hours. The density of larvae is recorded and compared to the pre-treatment collection numbers and used to determine the effectiveness of the aerial larvicide program. During the post-treatment larvicide surveys, the presence or absence of Aquabac 200G® is noted by the CMMCP field crews.

RESULTS

The average reduction in mosquito larvae amongst the towns of Boxborough, Billerica and Chelmsford following the 2020 spring larvicide application was 93.03%. Individually, the Billerica RDS exhibited an average reduction of 93.14% while an average reduction of 87.46% and 97.17% in Chelmsford and Boxborough respectively. This is in comparison to

the untreated (control) in the three communities which saw an average

increase of 12.64% from the beginning of the program (Table 1; Figures 1-3).

Table 1: Larval Surveillance of Treatment and Control RDS

Treatment Sites	Pre-application	Post-application	Observed Change
BIL116	49	1	-97.96%
BIL112	62	3	-95.16%
BIL408	62	1	-98.39%
BOX118	78	3	-96.15%
BOX66	63	4	-93.65%
BOX68	62	6	-90.32%
BOX92	69	5	-92.75%
CHM81	30	3	-90.00%
CHM279	31	4	-87.10%
CHM236	68	10	-85.29%
Control Sites	Pre-application	Post-application	Observed Change
BIL369	57	57	0.00%
BOX32	74	95	28.38%
CHM146	51	53	3.92%

Figure 1: Billerica Treatment RDS Pre and Post Application

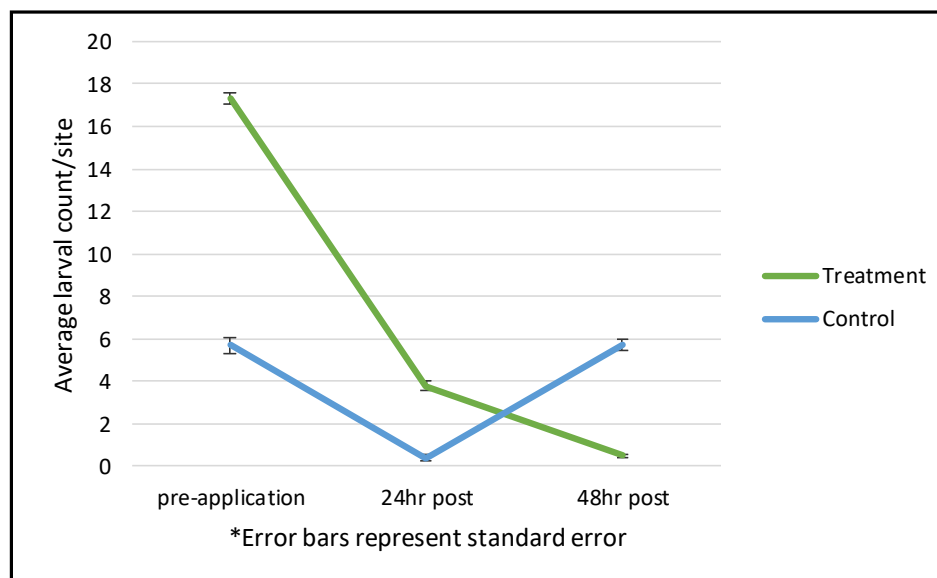


Figure 2: Chelmsford treatment RDS Pre and Post Application

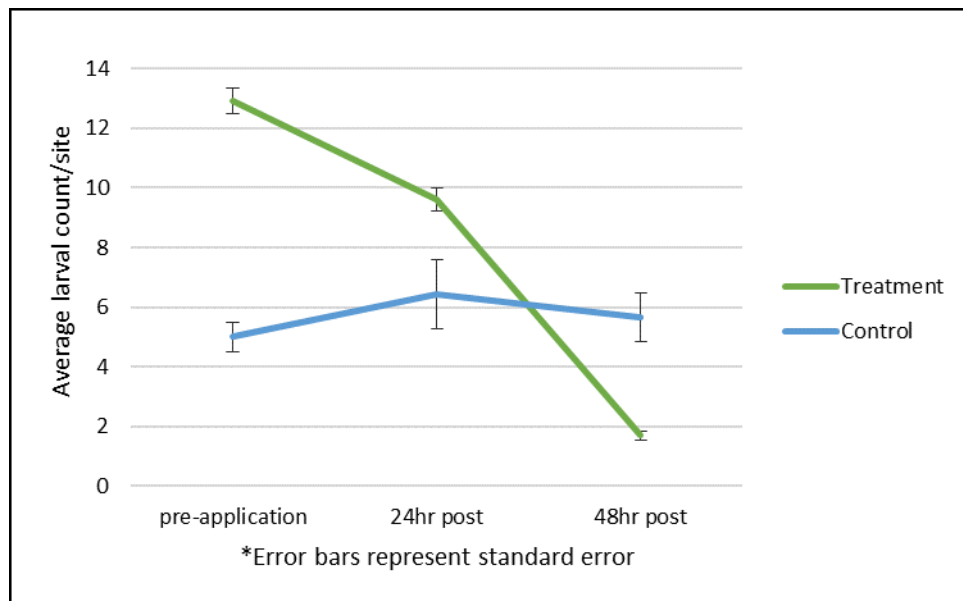
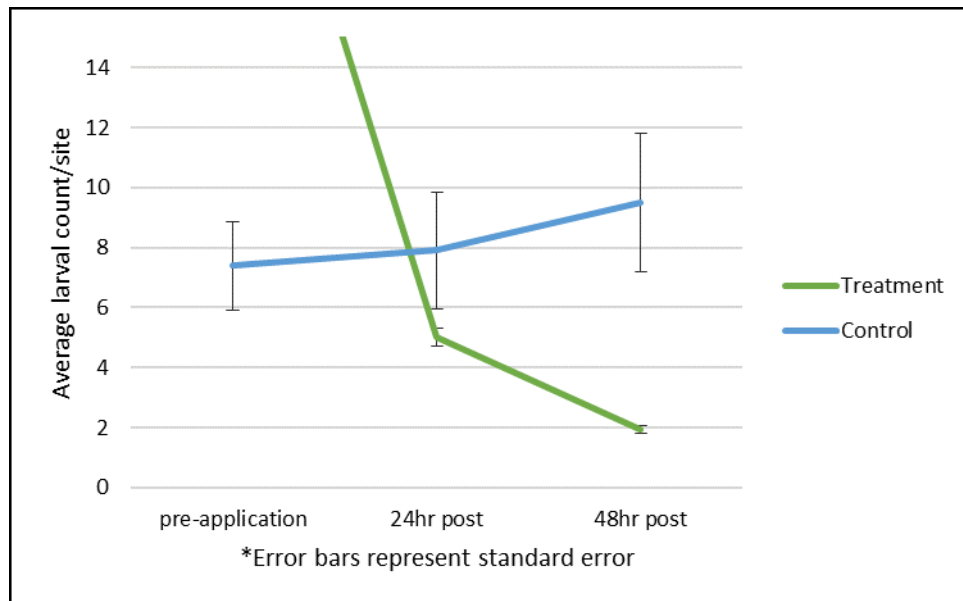


Figure 3: Boxborough Treatment RDS Pre and Post Application



DISCUSSION

As part of the plan to control adult mosquitoes, the juvenile larval form of the pest is targeted to reduce the size of the populations. Aerial release of the larvicide Aquabac 200G® allows CMMCP to reach sizeable wetland areas in Boxborough, Billerica and Chelmsford that would otherwise be too large or inaccessible, and therefore left inundated by mosquitoes. In 2020, the larvicide application took place April 22nd and 23rd. Larval surveys conducted prior to the treatment and twice following the treatment showed an average reduction of 93.03%. CMMCP considers this treatment a success.

The removal of the early brood *Ochlerotatus excrucians*, *Ochlerotatus abseratus* and *Ochlerotatus canadensis* mosquitoes from the environment, the residents of Billerica, Boxborough and Chelmsford will find less of the bothersome, biting pests. Because of this success the need for adulticide spraying will be reduced early in the season. CMMCP will incorporate this years' experience into future aerial programs. This includes the potential expansion of the program into additional CMMCP member communities.

ACKNOWLEDGMENTS

The authors would like to acknowledge the participation of Billerica, Boxborough

and Chelmsford in this supplemental program; North Fork Helicopters for providing the helicopter service; Warren Farm, Chelmsford and Minute Man Airfield, Stow for providing loading zones; the CMMCP Commission, and the CMMCP staff for larval monitoring, site selection, map development and assisting the helicopter application.

REFERENCES

- Andreadis TG, Thomas MC, Shepard JJ. 2005. Identification guide to the Mosquitoes of Connecticut. Bulletin of the Connecticut Agricultural Experiment Station 966:1-173
- Massachusetts Department of Agricultural Resources. 1998 Generic Environmental Impact Report (GEIR). Massachusetts Department of Agricultural Resources. Available from: <http://www.mass.gov/eea/docs/agr/mosquitoes/geir-docs/geir-full-text.pdf>
- National Pesticide Information Center. 2015 *Bacillus thuringiensis*: General Fact Sheet. National Pesticide Information Center. Available from <http://npic.orst.edu/factsheets/BTgen.pdf>
- Environmental Protection Agency. 2016 Bti for Mosquito Control: Available from <https://www.epa.gov/mosquitocontrol/bti-mosquito-control>

APPENDIX 1

The Boston Globe

Classified Legal Notice

Central Mass Mosquito Control 111 OTIS ST NORTHBOROUGH, MA 01532

Thank you for placing your Legal Notice in The Boston Globe.

ORDER INFORMATION:

Title:	Boston Globe	First date:	2/6/2020
Classification:	1505 Legal - Public Notice	Last date:	2/6/2020
		Number of Days:	1

NOTICE PREVIEW:

Legal Notice - Aerial Application to Control Mosquito Larvae

Per 333CMR 13.04(7)(a), the Central Mass. Mosquito Control Project (CMMCP), North Fork Helicopters and/or other contractors will be conducting helicopter applications to control mosquito larvae over selected large wetlands in Worcester and Middlesex counties. The applications will be conducted during the daylight hours from February 15 to October 31, 2020 as conditions warrant. The trade name(s) of the product(s) to be used are Aquabac 200G EPA Reg. #62637-3; Vectobac G EPA Reg. #73049-10; FourStar Bti CRG, EPA Reg. #85685-4; Natular G EPA Reg. #8329-80; Natular G30 EPA Reg. #8329-83. For additional information please contact Tim Deschamps at (508) 393-3055.

APPENDIX 2



OMRI Listed®

The following product is OMRI Listed. It may be used in certified organic production or food processing and handling according to the USDA National Organic Program regulations.

Product

Aquabac (200G) Mosquito Biolarvicide Granule

Company

Becker Microbial Products Inc.
Dr. Terry L. Couch
11146 NW 69th Place
Parkland FL 33076-3846 USA

Status	Category	Issue date
Allowed with Restrictions	NOP: Microbial Products	06-Jan-2016

Product number	Class	Expiration date
bmb-6012	Crop Pest, Weed, and Disease Control	01-Mar-2021

Restrictions

For use as a pest lure, repellent, or as part of a trap, or as a disease control.
May be used for other pesticidal purposes if the requirements of 205.206(e) are met, which requires the use of preventive, mechanical, physical, and other pest, weed, and disease management practices.


Executive Director/CEO

Product review is conducted according to the policies in the current *OMRI Policy Manual*® and based on the standards in the current *OMRI Standards Manual*®. To verify the current status of this or any OMRI Listed product, view the most current version of the *OMRI Products List*® at OMRI.org. OMRI listing is not equivalent to organic certification and is not a product endorsement. It cannot be construed as such. Final decisions on the acceptability of a product for use in a certified organic system are the responsibility of a USDA accredited certification agent. It is the operator's responsibility to properly use the product, including following any restrictions.



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