

# AN EXAMINATION OF EARLY SEASON TREATMENTS USING NATULAR™ G30

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## ABSTRACT

The Central Massachusetts Mosquito Control Project had utilized methoxychlor dust, an organochlorine, as a pre-hatch mosquito larvicide product prior to its discontinued use in the early 1980s. Since that time, CMMCP has not found a suitable replacement product for use against *Ochlerotatus abserratus*, *Oc. excrucians*, and to a lesser extent *Oc. canadensis*. Natular™ G30, a novel larvicide, was chosen to be evaluated as a potential alternative to methoxychlor dust in providing early season control of these mosquito species. Natular™ G30 controls mosquito larvae through the active ingredient spinosad, which is a byproduct of the soil bacteria *Saccharopolyspora spinosa*. Through field trials conducted in several local communities, CMMCP has determined that certain conditions, Natular™ G30 can be deployed for early season control of target mosquito species.

## INTRODUCTION

Central Massachusetts is scattered with woodland pools, many capable of harboring several early season mosquito species, including *Ochlerotatus abserratus* and *Ochlerotatus excrucians*. Both of these “snow pool” species are univoltine, meaning they only produce one generation a year, with any eggs laid during the season remaining dormant until the following spring. Although *Oc. abserratus* and *Oc. excrucians* do not pose a significant threat regarding West Nile virus and Eastern Equine Encephalitis, they are very pestiferous and greatly contribute to the service request calls early in the season by local residents. *Ochlerotatus canadensis* is another species that can develop in this type of habitat. Unlike *Oc. abserratus* and *Oc. excrucians* however, *Oc. canadensis* may produce multiple generations a year. Additionally, isolations of West Nile virus and Eastern

Equine Encephalitis have been detected from this species (Andreadis 2005).

Historically, CMMCP had utilized the organochlorine methoxychlor to combat spring mosquito species such as *Oc. abserratus*, *Oc. excrucians*, and *Oc. canadensis*. This larvicidal dust was spread onto the ice of known mosquito habitats during the winter months using rotary spreaders. Adult mosquito emergence would be greatly reduced as a result of these pre-hatch applications. At the time of its use, methoxychlor dust had a wide range of target insects, over a wide range of sectors including the agricultural, horticultural and veterinary fields (Extension Toxicology Network 1996). CMMCP has not used this product since the 1980s but also not found an appropriate replacement either.

One relatively novel product that may help treat early season mosquito species is Natular™ G30. Natular™ G30 is a slow release formulation of spinosad,

and is categorized as a Group 5 insecticide, as well as a “Reduced Risk” product by the Environmental Protection Agency. Spinosad is derived from the fermentation of *Saccharopolyspora spinosa*, a soil bacteria. As indicated by its name, Natular™ G30 is engineered to provide effective control for up to 30 days, according to the manufacturer Clarke Mosquito Control Products, Inc. (CMMCP 2016). Through field evaluations of this product, Natular™ G30 could become incorporated into the CMMCP larvicide program as an early season treatment option, expanding the window for larviciding and also decreasing the amount of adulticide events in the summer months.

## **MATERIALS & METHODS**

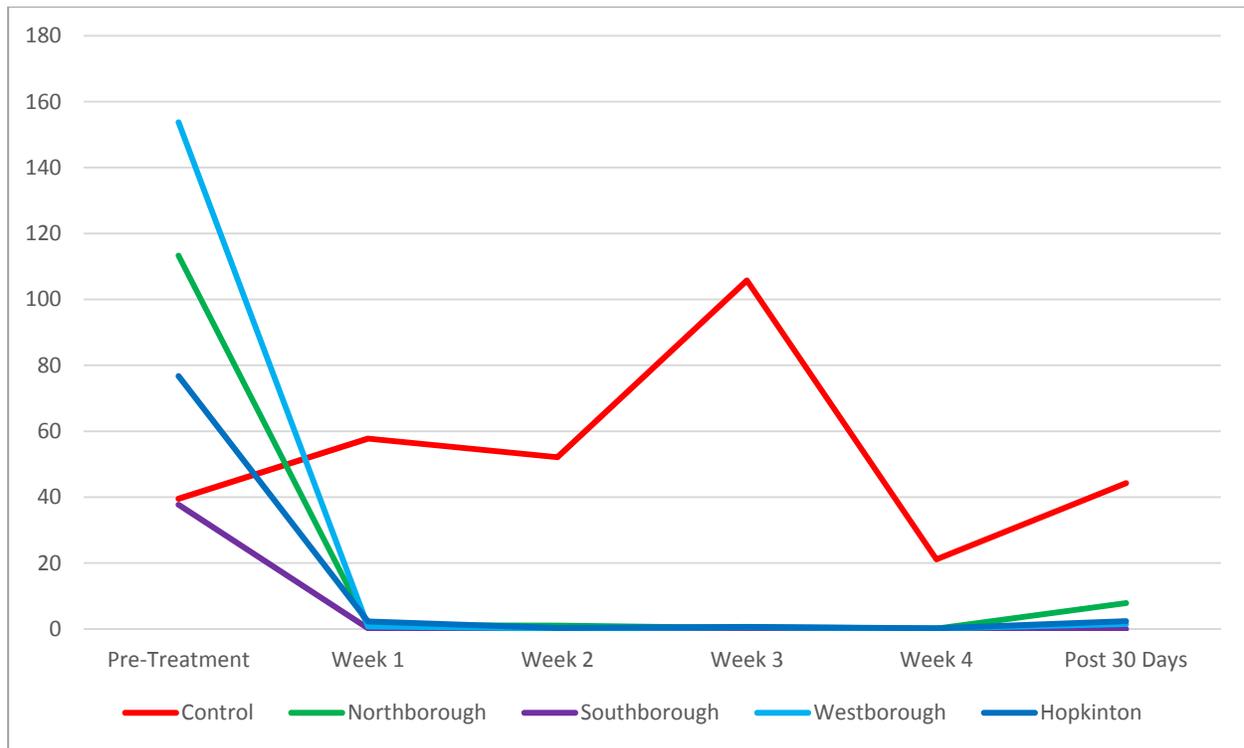
Four communities were included in this field evaluation, each with designated treatment and non-treatment sites to demonstrate the efficacy of Natular™ G30 against early season mosquito larvae. These towns included Northborough, Southborough, Westborough and Hopkinton. A total of eighteen treatment sites were used along with four untreated control sites. The sites used in this project all had a recorded history of early season mosquito larvae activity and the majority of the sites had been involved in previous Natular™ G30 field trials. Prior to any treatment, four recoverable dip stations (RDS) were established at all sites. These flagged sites were monitored for larval density before treatment and then twice a week throughout the duration of the evaluation. The Natular™ G30 applications at the treatment sites occurred on March 8, 2016, immediately following initial pretreatment larval

observations. The application rate for this project was 10lbs/acre with treatments ranging from 0.1lbs to 10lbs of Natular™ G30 depending on the size of the particular woodland pool. All final larval observations occurred in mid-April, past the advertised 30 day control window supplied by the product. The data collected from these field observations was statistically analyzed to determine whether the Natular™ G30 significantly controlled mosquito larvae, but also whether any changes occurred at the untreated control sites. In addition to the larval densities, water temperatures and general observations were noted for each RDS during the course of the Natular™ G30 evaluation.

## **RESULTS**

Statistical analysis determined that sites treated with Natular™ G30 experienced a significant ( $p < 0.05$ ) decrease in observed mosquito larvae from before treatment compared to observations through the duration of Natular™ G30 release. When grouped together by town, the treatment sites show steep decrease in larvae following treatment and remain at near zero throughout, although an increase is recorded after the active ingredient release period has past (Figure 1). In contrast the sites not applied with Natular™ G30 exhibited no significant difference in larval density prior to treatment with those during the evaluation process. Towards the end of the evaluation, larvae at the untreated sites reached late instar and also pupal stage. It is possible that some adult emergence may have occurred within the untreated control sites around the conclusion of the project.

**Figure 1: Larval Averages during Natular™ G30 Evaluation**



## DISCUSSION

This field evaluation of Natular™ G30 to determine if it would be a suitable early season mosquito larvicide indicates that it does have potential for this specific type of application. Unfortunately the window of control is limited by the 30 day release formulation of the product. Because of this characteristic, the application timing is critical to the effectiveness of the treatment. Within the 30 day spinosad release period following application, the larvae must hatch and become active enough to ingest sufficient product for successful control. If the Natular™ G30 is applied too early, eggs present may not completely hatch out, and those larvae present may not have enough time to consume enough spinosad for adequate control. If the Natular™ G30 was engineered for a longer release period the potential for

use as an early season treatment option would be much greater. Despite the opportunity for this product to be incorporated into the CMMCP larvicide program, there are many factors that would need to be considered further including cost. Regardless, Natular™ G30 will continue to be evaluated through more field trials in the 2017 season.

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## 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.

CMMCP [Central Massachusetts  
Mosquito Control Project]. 2016.  
Spinosad (Natular™) [Internet].  
Available from the Central  
Massachusetts Mosquito Control Project,  
Northborough, MA [accessed December

12, 2016].  
<http://www.cmmcp.org/spinosad.htm>.

Extension Toxicology Network.  
1996. *Methoxychlor*. Exttoxnet. Available  
from:

<http://exttoxnet.orst.edu/pips/methoxy.htm>