

FIELD TRIALS OF NATULAR™ G FOR PRE-HATCH CONTROL OF *COQUILLETTIDIA PERTURBANS* IN SELECTED RETENTION PONDS

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ABSTRACT

Emerging in large numbers every summer, *Coquillettidia perturbans* represents a significant mosquito issue for residents of central Massachusetts. This mammal biting species can carry both West Nile virus and Eastern Equine Encephalitis, and poses unique challenges to mosquito control agencies due to the larval stage characteristics. Overwintering in this stage, *Cq. perturbans* obtain their oxygen through the root systems of emergent vegetation, making surfactant and traditional larvicides less effective. Natular™ G, a commercial formulation of spinosad, has the potential to help address this pestiferous mosquito species. To evaluate Natular™ G against larval *Cq. perturbans*, CMMCP conducted field trials in select local retention ponds using emergence traps to monitor efficacy.

INTRODUCTION

For pre-treatments of various mosquito habitats (included cattail swamps), CMMCP historically used methoxychlor, but the use of this organochlorine has been discontinued since the 1980s. Although there has not been an equivalent alternative for methoxychlor, Natular™ G may help similarly control adult *Cq. perturbans* if strategically applied to the larval habitat during the previous fall. Spinosad is the active ingredient of Natular™ G and created from the fermentation of *Saccharopolyspora spinose*, a naturally occurring soil bacteria. As one of only two Group 5 active ingredients, this formulation of spinosad can be used in various mosquito habitats. This includes cattail marshes and freshwater bodies with emergent vegetation, which is where *Cq. perturbans* larvae would be developing, breathing through the root systems of the plants. Other mosquito habitats that can be treated with Natular™ G include storm water systems

and artificial containers. CMMCP sought to evaluate Natular™ G for use as a pre-hatch treatment, with applications taking place in the early weeks of fall to produce control for the following season.

MATERIALS & METHODS

Retention ponds for this trial were selected based on cattail presence, historical mosquito surveillance data, ability to treat, and finally ability to monitor. Once identified the project retention ponds were sectioned off into three distinct zones, treatment, buffer, and untreated (control). In the fall of 2016, Natular™ G was applied to the treatment zones of the retention ponds in accordance to the product label. Early in the following season emergence traps were placed into the treatment and control zones and monitored weekly throughout the season. A CDC trap baited solely with compressed CO₂ was also used for one trap night a week to assist in determining the local abundance of *Cq. perturbans*. Adult specimens

collected in the emergence traps from the treatment and untreated zones could be compared to one another to determine the level of control achieved from the Natular™ G applications. The CDC trap collections cannot be used to specifically examine the individual retention pond, but instead the local population of *Cq. perturbans* and the yearly and seasonal shifts when compared to historical trap site data.

CONCLUSION

The emergence trap surveillance from this trial did not produce a significant number of *Cq. perturbans*, either from the treatment or control zones of the retention ponds. Certain conditions exist that may be responsible for the relatively low number of individuals that were collected over the course of the project or in the least influenced the surveillance results. The first being that the emergence traps may have had issues containing the *Cq. perturbans* larvae and emerging adults. The traps constructed by CMMCP were similar in design to other emergence traps that have had documented success, so this is not proposed as the reason for reduced specimen observations. Regardless, the current emergence traps will be reviewed to ensure proper collections take place.

Another potential possibility for the low emergence trap *Cq. perturbans* numbers could have been the unfavorable larval conditions leading into the study. At the time Natular™ G applications were made

to the retention ponds in the fall of 2016, the region was experiencing a prolonged drought. There was very little standing water in the retention ponds or other local *Cq. perturbans* habitats. Although the larvae can withstand drier conditions, the severe drought may have negatively impacted their population across the region. Supporting this possibility were the CDC traps that were deployed near the retention ponds. Over the course of the season these traps produced much lower *Cq. perturbans* numbers than had been collected historically. It should also be noted that the CMMCP surveillance program observed an overall reduction in the *Cq. perturbans* population of approximately 64% this season compared to last.

Applications of Natular™ G to local retention ponds were expanded in the fall of 2017, with the region recovered from the drought. Conditions observed in these cattail habitats appeared to be much more supportive of *Cq. perturbans* larvae than during the 2016 treatments. If Natular™ G proves to be an effective pre-hatch control measure through the 2018 field trials, applications could be integrated into the CMMCP larvicide program and expanded. A significant reduction of *Cq. perturbans* would ease the demand for adulticiding service requests from the residents of central Massachusetts and more importantly reduce this potential vector of West Nile virus and Eastern Equine Encephalitis.