Northern NY Agricultural Development Program
2017-2018 Project Report

Evaluation of Alternative Application Methods of Biocontrol Nematodes in Alfalfa and Corn

Project Leader(s):

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Collaborators:

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Cooperating Producer(s):

- Garden of Eden Farm, Philadelphia, NY
- CTS Dairy, Ellisburg, NY
- Reedhaven Farm, Adams Center, NY
- Murcrest Farm, Copenhagen, NY
- Demko Farm, Martinsburg, NY
- Marks Farm, Lowville, NY

Background:

Research, funded by the Northern New York Agricultural Development Program, has shown that biological control with entomopathogenic (insect-attacking) nematodes is effective in reducing snout beetle populations to sub-economic levels in alfalfa fields where the native NY-adapted nematodes have been established. Preliminary findings from additional research trials in New York State indicate that these same biocontrol nematodes have the potential to control corn rootworm, a significant pest of field corn in

NY. To date, biocontrol nematodes have been applied to nearly 19,000 acres in Northern New York.

The current recommended application method of biocontrol nematodes is to rinse nematodes with high volumes of water through fine mesh screens into a holding tank. The nematode solution is then deposited into a field sprayer equipped with streamer nozzles or drop tubes. The nematodes are field applied using high volumes of water, 50 gallons or more per acre. This is a vast improvement over earlier-tested application methods, yet it is still a very time-consuming process. Nematodes are also very sensitive to UV light; therefore, these applications are made in the evening to protect the nematodes from sunlight until they enter the soil.

In response to farmers are asking for a simpler and more farmer-friendly method to apply biocontrol nematodes to their fields, in 2016, we established a replicated, small plot field trial on a farm in Jefferson County using liquid manure as the "carrier" of biocontrol nematodes. Soil samples were taken several weeks after the manure/nematode treatments to determine if nematode establishment was successful. While our establishment results were not as good as a water/nematode application, it certainly showed that application via liquid manure may be a viable method of nematode application.

The application of biocontrol nematodes through liquid manure field applications can eliminate the need for an additional field operation. The manure may be effective in protecting the nematodes from UV light. This could also potentially eliminate the requirement to apply nematodes in the evening hours. Our goal is to increase the number of application methods to apply biocontrol nematodes. Simpler application methods will likely increase the adoption of this biocontrol for both alfalfa snout beetle and corn rootworm in NNY.

Methods:

We applied biocontrol nematodes using liquid manure as the delivery method in 6 fields on the participating farms in NNY. For comparative purposes, two of the field sites included use of the currently-used field sprayer streamer application, using water as the delivery method, as the standard application treatment method.

We applied different rates of biocontrol nematodes with the manure delivery method. Our initial work in 2016 indicated that we experienced higher biocontrol nematode mortality if they were held in liquid manure for longer than 30 minutes. The length of time the biocontrol nematodes were in each individual load of manure was recorded for comparison to establishment percentage. Approximately 45 days after the manure application we sampled the soil to determine the success of nematode establishment.

Results:

We applied biocontrol nematodes to six different fields on six farms in NNY using liquid manure as the carrier and application method. The soil sample results confirmed positive establishment of biocontrol nematodes in all fields sampled. One interesting outcome

was that increasing the number of cups of biocontrol nematodes applied per acre did not influence the number of positive soil samples in each treatment (Table 1).

Table 1. 2018 Biocontrol Nematode Establishment Assay Using NNY Manure Trials in Northern New York, NNYADP project.

2018	% EPN Positive Soil Samples – NNY Manure Trials						
Location	**Sc**	**Sf**	**Hb**	**Combo**	**Cups/Ac**	**Minutes in Manure**	**Manure Tank Circulation**
Copenhagen-Trt 1	6±4	35±5	0±0	41±9	8	20	YES
Copenhagen-Trt 2	2±2	28±7	0±0	30±6	4	22	YES
Copenhagen-Stream	0±0	37±4	0±0	37±4			
Lowville-Blue Trt	0±0	25±4	0±0	25±4	10.34	20	NO
Lowville-Pink Trt	2±2	32±6	0±0	33±7	6.89	21	NO
Lowville-Orange Trt	0±0	28±3	0±0	28±3	3.44	22	NO
Philadelphia-Right	3±2	30±3	0±0	33±3	5	4	YES*
Philadelphia -Left	0±0	26±3	0±0	26±3	10	11	YES*
Ellisburg-Field 1	1±1	37±6	0±0	38±6	10	13	NO
Ellisburg-Field 2	0±0	29±4	0±0	29±4	5	10	NO

These results demonstrate that biocontrol nematodes can be effectively applied to fields via liquid manure as the carrier and delivery method. The next step in this process will be to repeat this trial in 2019. We need to determine the lowest possible number of biocontrol nematodes that can be applied per acre with manure and still achieve successful establishment with reduced cost and labor.

Outreach:

The results from this on-farm research trial are being disseminated to crop growers, crop consultants, agribusinesses, and extension field crops staff members throughout New York State. The data has been included in presentations in early 2019 at the North Country Crop Congresses in Chazy and Watertown, the Lowville Farmers Cooperative Winter Crop Meeting in Lewis County, the CCE Central NY Corn Day in Cooperstown. and the DeRuyter Farm Co-Op Winter Grower Meeting, and through the CCE NCRAT agricultural newsletter and other CCE agricultural newsletters.

For More Information:

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