Cornell University
Cooperative Extension

September 2010

Managing Bloat Nematode in Garlic

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Cornell University Nematologist Dr. George Abawi has verified that Bloat Nematode (*Ditylenchus dipsaci)* is widespread in garlic throughout New York State. Different life stages of this nematode were recovered from garlic samples submitted from 14 counties including Erie, Fulton, Genesee, Livingston, Monroe, Niagara, Onondaga, Orleans, Orange, Ontario, Saratoga, Schenectady, Schoharie, and Washington. Bloat nematode is a potentially very destructive pest of garlic. It is typically introduced to a farm via infested seed. It survives in seed, crop debris and soil. This pest can remain at low and virtually undetectable levels for several years before populations explode and cause high levels of damage. Managing bloat nematode requires your awareness of the problem. If not already present, you can prevent nematode introduction onto your farm via infested seed and subsequent buildup in your soils.

Determine if you have bloat nematode
George Abawi's lab at the NYSAES can analyze samples of new infestation sites. Contact your local Cornell Cooperative Extension Vegetable Specialist to arrange to have samples submitted. From this year's crop, for each variety, select 10 of your most suspicious bulbs for testing. Look for bulb splitting, damaged basal plates, and desiccated shrunken bulbs. Often secondary bacteria, fungi, maggots and bulb mites also occur.

Only plant clean seed
Bloat nematode is introduced and perpetuated by planting seed that is infested. ***Do not replant any of your garlic from an infested lot.*** Even if bulbs appear normal (symptomless), low levels of bloat nematodes can increase a thousand fold during one growing season. This means that garlic that showed no symptoms when it was planted could become heavily infested by the time it is harvested the next season. There is currently no NYS certification program for garlic seed, so you will have to work with suppliers to determine how they have ensured their seed is clean. If you or your supplier have not had your seed tested, it cannot be guaranteed to be nematode free. Even if seed tests clean, it does not guarantee that bloat nematode does not occur, it just means that it is undetectable. The Abawi research laboratory at Cornell is not able to process large numbers of seed samples for nematode verification, but you can send your samples to the Michigan State Diagnostic Services: http://www.pestid.msu.edu/AbouttheLab/LabStaff/tabid/63/Default.aspx . For each lot, send in 10 bulbs as described in #1. It is recommended to have clean seed re-tested at least every 5 years.

Do not sell bloat nematode infested garlic for seed
Selling quality bulbs infested with bloat nematode for food is acceptable. Garlic festivals may have more detailed rules.

Plant garlic in a location that has not been cropped to garlic for at least 4 years
Bloat nematodes can also live in the soil and on alternate hosts. To eliminate and/or to prevent build-up of the nematode populations in the field, rotate away from any *Allium* crops (garlic, onions, leek, chives),

celery, parsley, or salsify, and areas with high populations of hairy nightshade weeds. Also, to reduce soil levels of bloat nematode where garlic was grown in 2010, do not plant garlic and control nightshades for at least 4 years in these areas.

Plant cover crops after harvesting garlic
To help reduce levels of bloat nematode in the soil, bio-fumigant cover crops may be planted after harvesting garlic. Mustard, sorghum-sudangrass and other cover crops have been shown to reduce nematode populations due to their bio-fumigant effect, thus they may effectively reduce bloat nematode populations too. For information on seeding rates, fertility needs and seeds sources, visit the cover crop website at http://calshort-lamp.cit.cornell.edu/bjorkman/covercrops/fall-mustard.php or contact your vegetable specialist.

If possible, keep fields moist
To help reduce levels of bloat nematodes in the soil, keep your fields where garlic is or was grown moist, because bloat nematodes cannot survive for long periods in moist soils. They can persist for several years in dry soil and on dry plant residue.

Practice good sanitation
Bloat nematode can survive better in dried crop debris than it can in farmed soil. The dormant juveniles of this nematode are lodged in crevices on the surfaces of seed and in the outer sheath layers of bulbs and cloves. Clean up equipment and storage areas with aggressive sanitation techniques. ***Do NOT dump infested bulbs or debris in any of your fields.***

Test your soil
If you know that you have a bloat nematode infestation on your farm, you may want to test your soil for presence of nematodes prior to planting your next garlic crop. A composite sample should be taken for every 2-3 acres. A composite sample consists of 15-20 sub-samples collected following an X or V pattern across the sampling area. Thoroughly mix each composite sample and submit a soil volume of 1-2 quarts for analysis. Soil samples can be sent to the MSU diagnostic lab as described above. Damage may occur at infestation levels as low as 10 nematodes per 500 g of soil.

Treat infested fields with a conventional fumigant-type nematicide
This is an option for conventional growers. Custom applications of Telone-C17 or Vapam are available for use in New York as pre-plant treatments and are highly effective against the bloat and other plant-parasitic nematodes, where appropriate and cost-effective.

No non-fumigant nematicides available
Non-fumigant nematicides such as Vydate may be applied to the soil as a broadcast and incorporated application, or as a drench at planting or as a banded spray after planting to reduce levels of bloat nematode in the soil. They would not control bloat nematodes that occur in infested cloves or bulbs. Unfortunately, there are no such materials that are registered in New York to control or suppress bloat nematode on garlic.

Contact info of Vegetable Specialists working with bloat nematode
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