

Stem & Bulb Nematode Confirmed in Garlic in NY

Crystal Stewart, CCE Capital District Vegetable & Small Fruit Program

In early June 2010 Cornell Vegetable Program Specialist Christy Hoepfing discovered stem and bulb (bloat) nematode in two commercial garlic fields in Western NY. The nematode caused high levels of damage in one of the fields. The discovery of this disease in NY, the first since the 1930's, when it came in on onion sets, has led to a statewide response by Cornell Cooperative Extension staff and the Garlic Seed Foundation. The first goal is to determine which areas of the state contain infected garlic. Symptoms of stem and bulb nematode include twisting, looping or swelling of leaves (leaves are infected), stunting, and yellowing. If you have seen unusually high levels of damage from Fusarium or other fungi, bacteria or insects, this may be a sign of nematode infection. Any NY grower that suspects problems should contact their local Extension support person, who can submit a sample for verification. As of late 2011 the garlic bloat nematode had been found on many farms across the state.

Symptoms of *Ditylenchus dipsaci*, a plant-parasitic nematode:

According to Dr. Abawi, "Symptoms on cloves of infected plants initially appear as light brown discoloration but later the cloves become soft, mealy or spongy in texture and deformed. At later stages of infection, the cloves break away from the basal plate leaving cracks of various sizes and usually soft rots follow due to invasion by various secondary soil organisms. However, documenting the presence of the bloat nematode in infected plants/tissues is critical in confirming the disease diagnosis and recommending the proper management." Additional symptoms noted by the Ontario Ministry of Agriculture, Food and Rural Affairs include underdevelopment of the bulb and the absence of roots on one side of the basal plate (Image 1) as well as soft rot (Image 2).

Symptoms of Fusarium Basal Rot (*Fusarium oxysporum* f. sp. *cepae*):

It is possible to confuse Fusarium with nematode infection. Dr. Abawi **notes of Fusarium:** "At early stages of disease development, infected and healthy heads or cloves can not be distinguished from each other by external symptoms. However, cutting open an infected clove vertically will clearly show a brownish discoloration of the stem plate from the outermost layer and extending upward. At later stages of infection, the stem plate tissues become pithy in texture, but the cloves will only show a dry rot. A wet bulb/clove rot will develop starting with the basal plate tissues only when secondary organisms become involved. Under moist and favorable temperature, abundant growth of the pathogen covering the basal plate tissues become evident. Roots of infected plants are dark brown and at various stages of decay. Most severe and diagnostic symptoms are generally found on stored heads, but field symptoms are also detectable and especially in heavily infested fields. Above-ground symptoms on severely infected plants appear as stunting and yellowing of the leaf blades starting at the leaf tip and progressing downwards involving the entire blade. Later, such leaves may shrivel and decay."

If you are unsure if you have Fusarium or nematodes, contact your local vegetable Extension specialist.



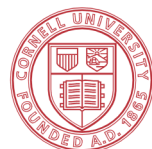
Image 1: Stunting and root loss on one side of the basal plate caused by stem and bulb nematode.

Source: www.omafr.gov.on.ca



Image 2: Basal plate soft rot due to nematode infection. Other fungi, bacteria, maggots, thrips larvae may also invade the bulb.

Source: www.omafr.gov.on.ca



Cornell University
Cooperative Extension
Cornell Vegetable Program

Testing for Garlic Bloat Nematode

Crystal Stewart, CCE Capital District Vegetable & Small Fruit Program, and George Abawi, Cornell

Garlic growers can submit samples, through September 2014, to Cornell Nematologist George Abawi's lab for testing using a standardized submission form. Submission is being subsidized through a Specialty Crop Block Grant, and will cost \$20 per sample of garlic or soil for NYS growers and industry reps. Growers are encouraged to sample different plantings separately, selecting 10 representative bulbs per planting per sample. Soil should be tested to a depth of 6-8 inches, and in 10+ sites through the suspect field then mixed before bagging. Make sure samples are secured against leaking or damage during shipping. Garlic samples should be surrounded in a layer of absorbent material such as paper towel. Soil should be placed in a Zip-Loc bag and should not be dried before shipping.

If you have questions about sampling, please contact your local vegetable specialist for assistance. To send in a sample, fill out the submission form (below) as completely as possible and mail overnight or first class with your check and your sample. You should receive results within two weeks.

Bloat Nematode Diagnostics Lab SAMPLE SUBMISSION FORM



Cornell University
Cooperative Extension

Location where the sample was taken <input type="checkbox"/> Home Owner <input type="checkbox"/> Commercial Growers <input type="checkbox"/> Others Collection Date _____ Business Name _____ Contact Person _____ Address _____ County _____ Phone _____ Email _____	Referring Agent (i.e. CCE Educator) Name _____ Email _____
Describe the nature and extent of the problem _____ _____ _____	
Production History <input type="checkbox"/> Organic <input type="checkbox"/> Conventional Previous Crops 2013 _____ 2012 _____ 2011 _____ 2010 _____	Objective of Testing <input type="checkbox"/> Sale for Seed <input type="checkbox"/> Sale for Food <input type="checkbox"/> Sale for Seed and Food <input type="checkbox"/> Seed for Replanting <input type="checkbox"/> Poor Growth/Quality <input type="checkbox"/> Soil Infestation
Size of Planting <input type="checkbox"/> < 1/4 Acre <input type="checkbox"/> 1/4 – 1/2 Acre <input type="checkbox"/> 1/2 – 1 Acre <input type="checkbox"/> 1-2 Acres <input type="checkbox"/> > 2 Acres <input type="checkbox"/> Area Affected _____	Sampling Instructions Samples can be collected anytime, but best close to harvest and before planting. Send 10 representative bulbs/ variety/ garlic sample, or one pint or more of a composite soil sample (> 10 subsamples)/ field or bed. Pack garlic and soil sample separately and avoid exposure to sun and high temperature. Send early in the week by overnight delivery, if possible.

Production History

Organic Conventional
Previous Crops 2013 _____ 2012 _____ 2011 _____ 2010 _____

Objective of Testing

Sale for Seed Sale for Food Sale for Seed and Food
 Seed for Replanting Poor Growth/Quality Soil Infestation

Size of Planting

< 1/4 Acre 1/4 – 1/2 Acre 1/2 – 1 Acre
 1-2 Acres > 2 Acres Area Affected _____

Fee: \$20/sample (garlic or soil) for NY growers and industry reps; \$40 for all others.

Make check payable to **Cornell University**. Write **Garlic Project** on the check's memo line.

Mail sample and payment to: Cornell - NYSAES, Barton Lab, Room 111, 630 West North St, Geneva, NY 14456