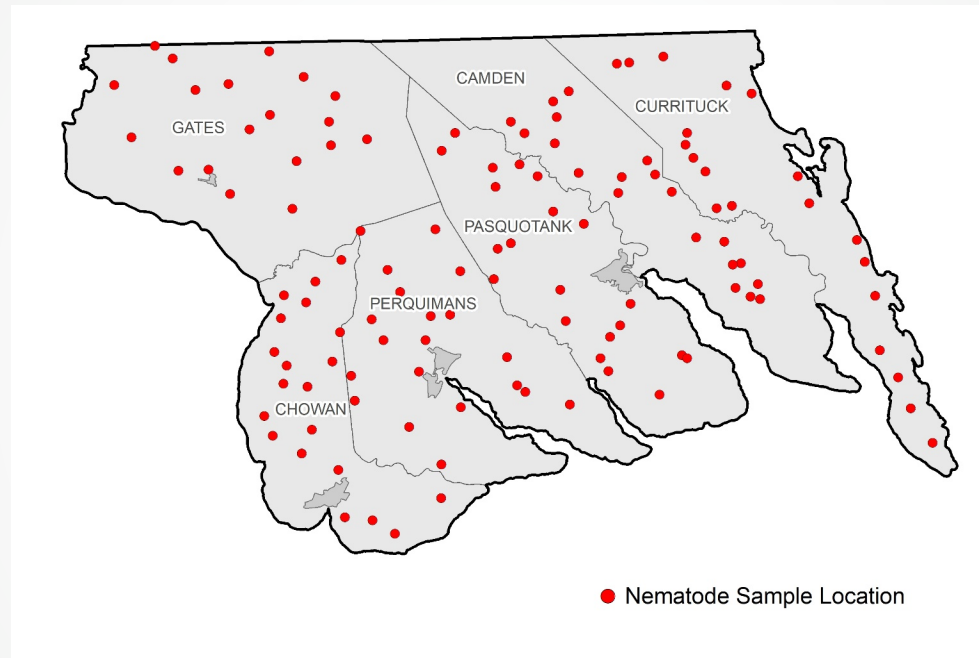


# NORTHEAST AG EXPO

## 2020 Nematode Study Results



CAMDEN • CURRITUCK • CHOWAN • GATES  
PASQUOTANK • PERQUIMANS

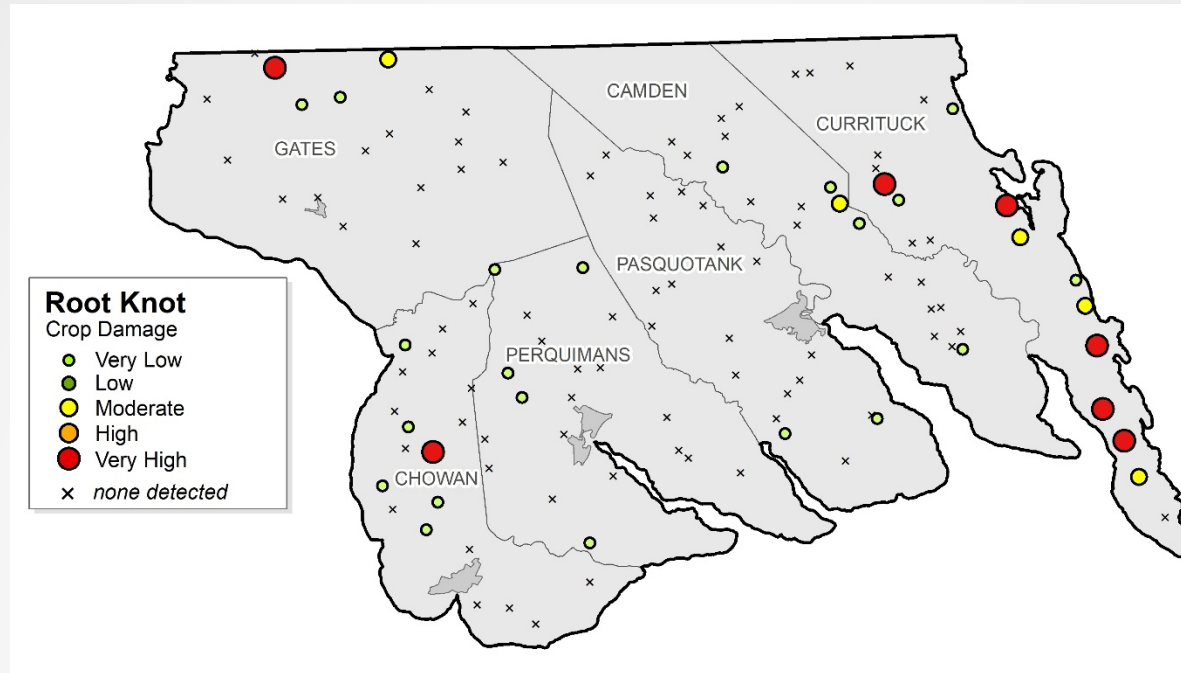
## Introduction

- Plant-parasitic nematodes feed on crop roots while directly and/or indirectly damaging plant health and potentially reducing yield. Soybean is a host to a wide diversity of plant parasitic nematodes, which sometimes damage plant roots without resulting in any obvious aboveground symptoms. As a result, a reduction in soybean yield is often observed.
- To determine the type and frequency of nematode populations in Northeastern North Carolina, agents from the Camden, Chowan, Currituck, Gates, Pasquotank, and Perquimans County Extension Centers sampled 120 locations within the 6-county area. Sample locations were randomly selected using GPS coordinates, with fields that were currently in soybean production sampled in October of 2020. Samples were collected in a manner consistent with North Carolina Department of Agriculture and Consumer Services (NCDA&CS) guidelines and subsequently sent to the NCDA&CS Agronomic Division Nematode Assay Lab for analysis. Please find the results in the upcoming pages.
- The Northeast Ag Expo Team would like to thank Dr. Adrienne Gorny, Dr. Lindsey Thiessen, and Dr. Rachel Vann for their guidance with this study. Also thank you to Robert Austin for his assistance with creating the maps found in this report. Lastly thank you to the North Carolina Soybean Producers Association for their support. Without their support, projects like this would not be possible.

## Survey Results

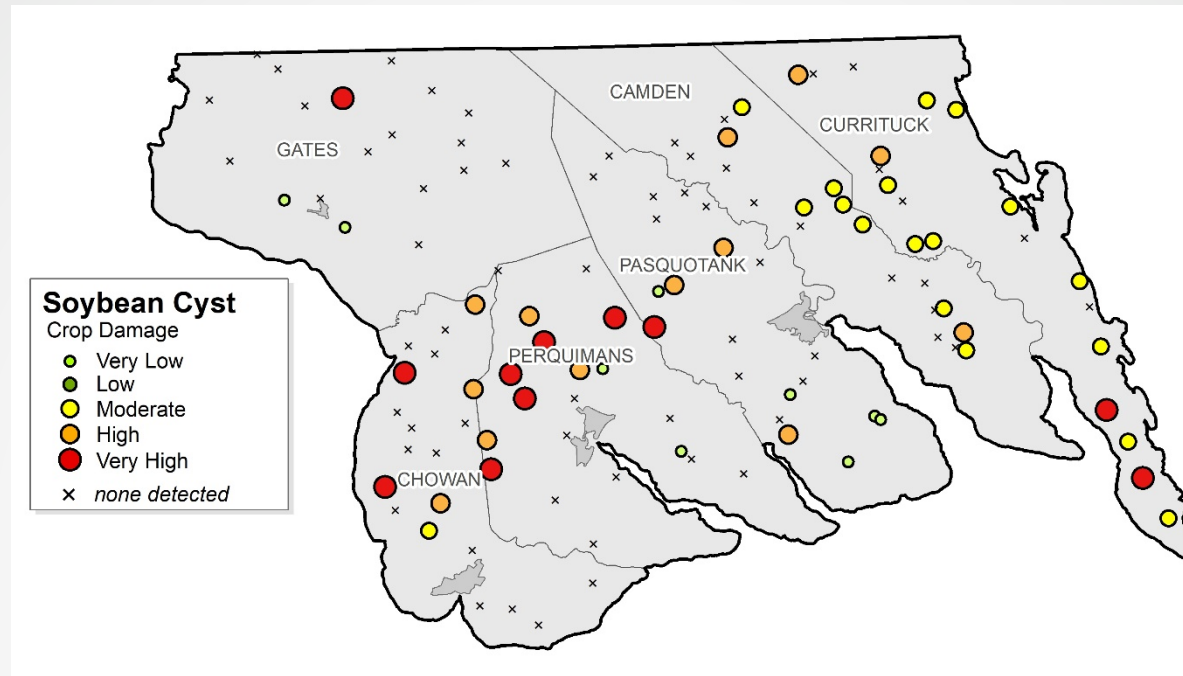
- The survey collected 120 soil samples from soybean fields across a 6 county region. A total of 9 different *genera* or types of nematodes were found in the samples from this survey. However, not all samples had the same types of nematodes, nor at the same population counts. This is very typical for nematodes.
- Different types of nematodes will cause different amounts of crop damage at a given population count. This is because some nematodes are more aggressive and damaging than others. This is reflected in the hazard index rating for each type of nematode.
- For some of the nematodes, a hazard index is not given. This is because the hazard index for these nematodes is not well understood or is too highly variable. For the nematodes that do not have a hazard index, only the relative population counts are shown in the maps. In general, higher population counts indicate higher risk of potential crop damage.

## Root-knot Nematode



- Root-knot nematodes (RKN; *Meloidogyne* spp.) were found in numerous samples throughout the survey region. Some had counts high enough to warrant a “very high” hazard index. Root-knot nematodes have a broad host range (that is, the crops they are able to feed on and cause damage to). This makes these high counts problematic to soybean, as well as many other rotational crops, such as cotton, corn, potato, and other vegetables.
- In fields where RKN is observed at a “moderate” to “high” hazard index, a soybean variety with RKN resistance is recommended. Seed treatment nematicides can be beneficial under “low” to “moderate” nematode pressure.

## Soybean Cyst Nematode



- Soybean cyst nematode (SCN; *Heterodera glycines*) was observed in all the counties in the survey region, many at “moderate” to “high” hazard index. These high hazard index levels reflect the low threshold for SCN in soybean. Even a low population can quickly increase on a susceptible soybean variety.
- The frequent occurrence of SCN across the whole survey region should alert all growers to potential infestation. The SCN has a narrow host range and can only infect soybean and other beans, such as common bean and dry bean.
- In fields where SCN is confirmed, an aggressive rotational plan that incorporates non-host crops, soybean varieties with SCN resistance, cultural and chemical control is recommended. Further information on this type of management plan is available at <https://content.ces.ncsu.edu/management-of-soybean-cyst-nematode>.



## Soybean Cyst Nematode Continued

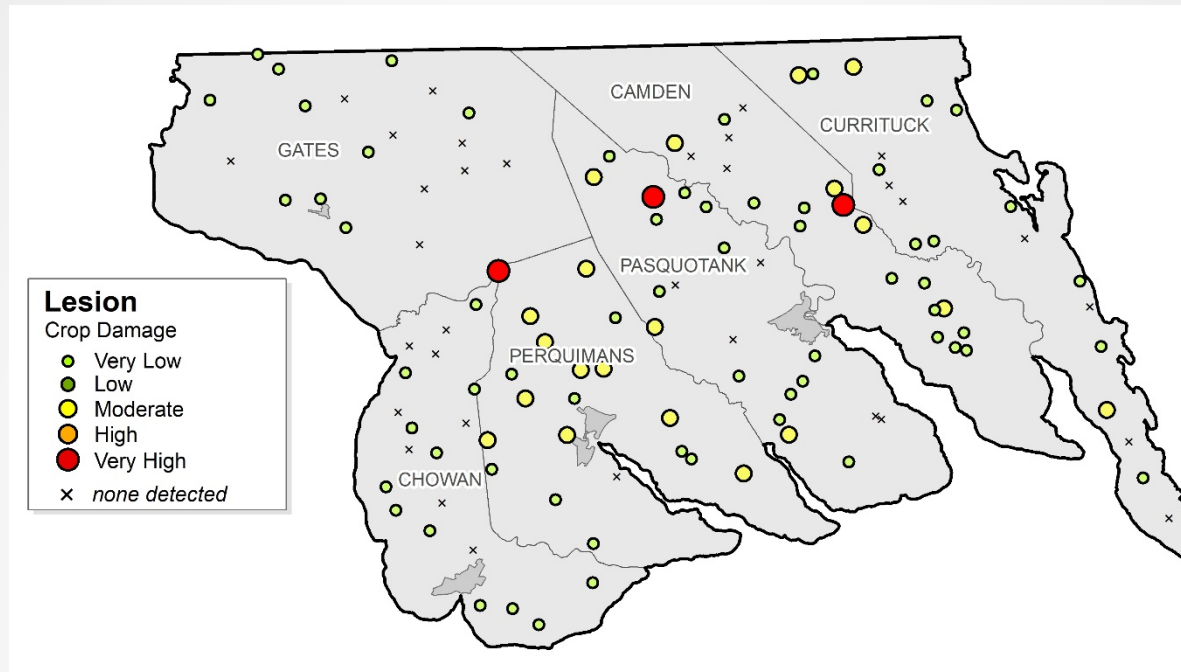


Image: [Crop Protection Network](#)

### **Assessment of Soybean Cyst Nematode “HG type” from 2019 Nematode Study**

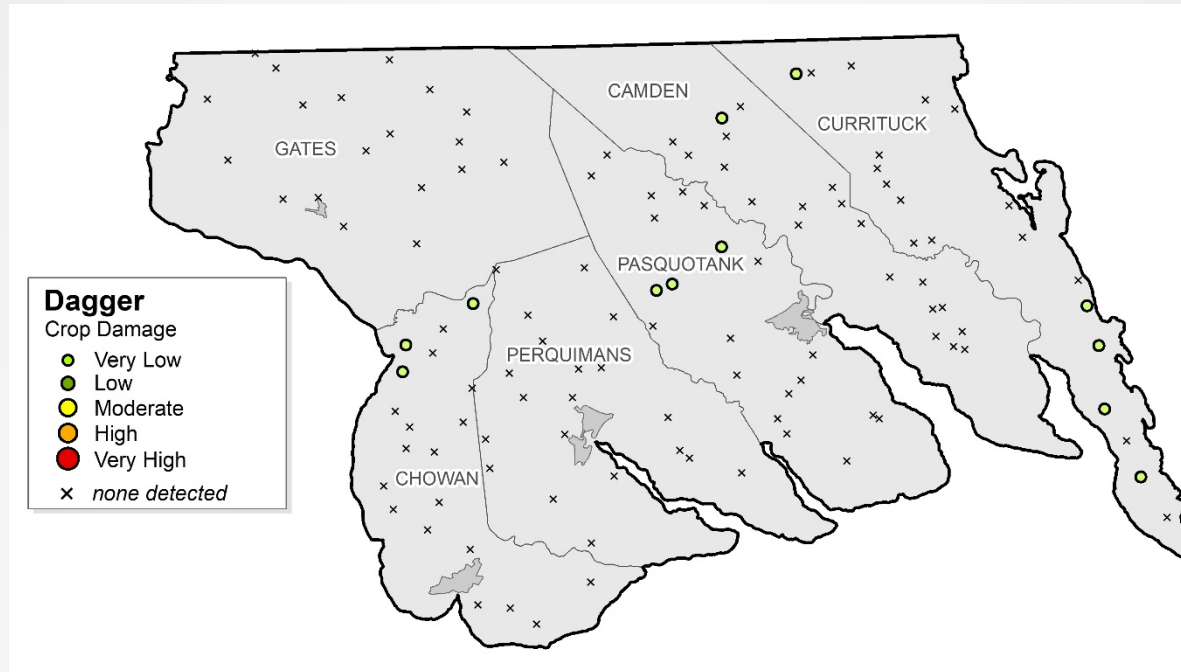
- In a study performed by the Northeast Ag Expo Team in 2019, 2 samples from each of the 6 counties were taken from fields previously identified with “High” soybean cyst pressure. Soil samples were submitted to the Michigan State University Plant & Pest Diagnostics Laboratory for determination of the “HG type” of the SCN population contained within the sample.
- The HG type system was devised to make it easier to select the best SCN-resistant soybean varieties to plant. The HG type system is based on which SCN-resistant varieties that particular population of SCN is able to overcome. In other words, which SCN-resistant varieties are no longer effective in inhibiting the nematodes. If we know this information, we can avoid those varieties and select a different variety that is effective in inhibiting the nematode. The acronym “HG” stands for *Heterodera glycines*, the scientific name for SCN.
- One of the samples was found to have **HG type 1.2**. This means the SCN population from that sample is able to overcome resistance from Peking and from PI88788. Because of this, it would be best not to use varieties with SCN resistance from Peking or PI88788, but to choose a different source of SCN resistance.
- Another sample was found to have **HG type 2.5.7**. This means the SCN population from that sample is able to overcome resistance from PI88788, PI209332, and Cloud. Because of this, it would be best not to use varieties with SCN resistance from PI88788, PI209332 or Cloud, but to choose a different source of SCN resistance.
- No matter what the current HG type is, it is advisable to rotate planting of different SCN-resistant soybean varieties between years. This reduces the chance that a new HG type develops in the field.

## Lesion Nematode



- Lesion nematodes (*Pratylenchus* spp.) were frequently observed in many of the soil samples across the survey region. Several of the samples had a “very high” hazard index, meaning the lesion nematode counts were very large. The very frequent occurrence of this nematode across the whole survey region should alert all growers to potential infestation.
- Lesion nematodes have a broad host range. In addition to soybean, they may be damaging to cotton, corn, tobacco, and vegetables. They can reach damaging levels quickly and fields with known lesion nematode should be monitored closely for potential crop damage.
- Unfortunately, no genetic host resistance is known for lesion nematode. Seed treatment nematicides can be beneficial under “low” to “moderate” nematode pressure.

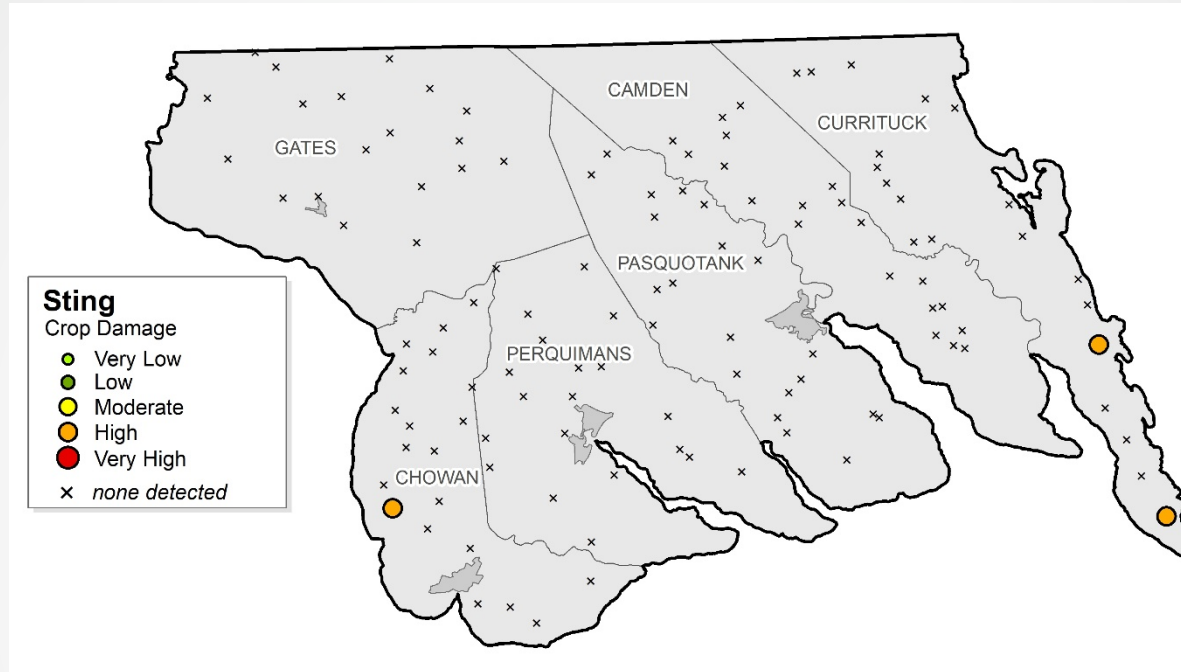
## Dagger Nematode



- Dagger nematode (*Xiphinema* spp.) was only observed in a handful of samples across the survey region. On it's own, the dagger nematode is not thought to cause excessive damage, only in cases of very high population counts. However, the dagger nematode is capable of vectoring certain plant viruses. These plant viruses may be more problematic than the nematode itself.
- If a field has suffered problems with plant viruses in previous years, soil sampling for assessment of dagger nematode populations may be helpful.

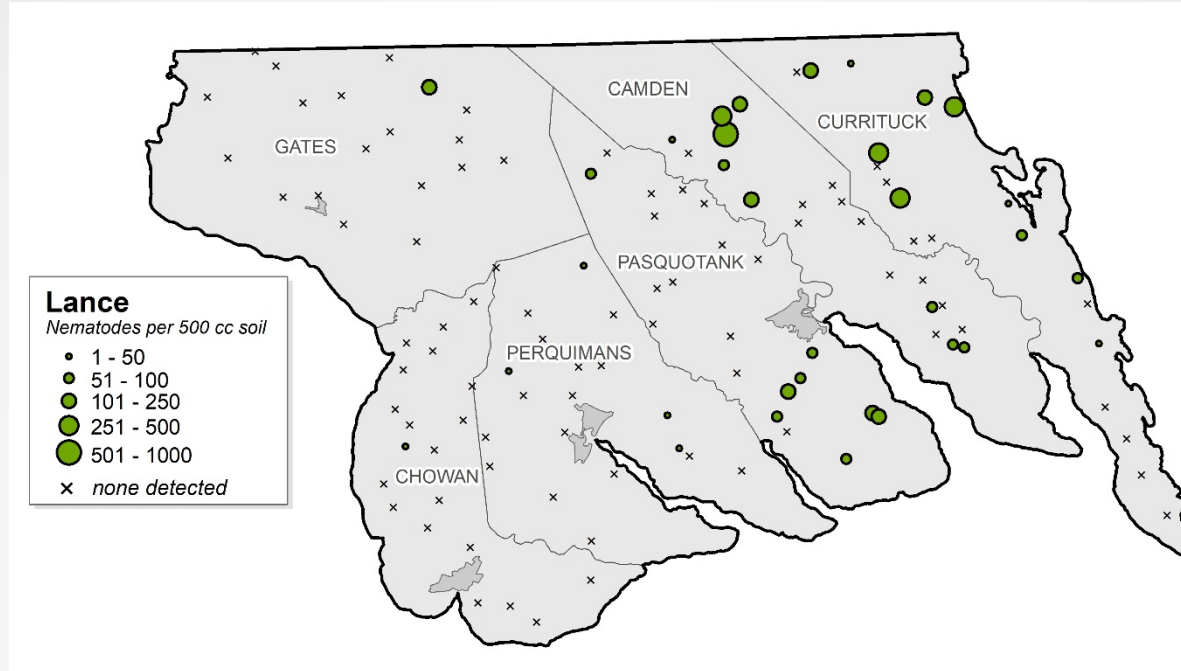


## Sting Nematode



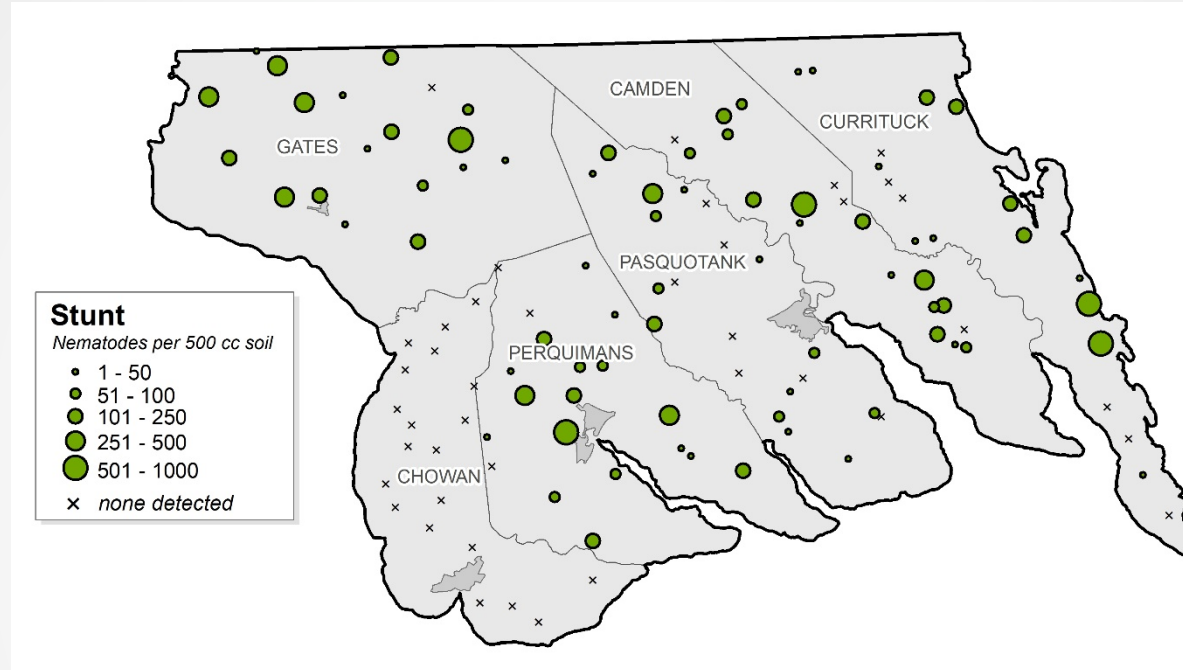
- Sting nematode (*Belonolaimus* spp.) was observed in a few samples in Currituck and Chowan Counties. The sting nematode can be very damaging even at low population counts. The nematode can impact soybean, peanut, cotton, corn, and many other crops. Thus, fields that have sting nematode should consider an active nematode management plan. Sting nematode tends to be limited in occurrence to sandier soil types.
- In many cases, sting nematode responds well to nematicide application and may also be managed through clean fallows.

## Lance Nematode



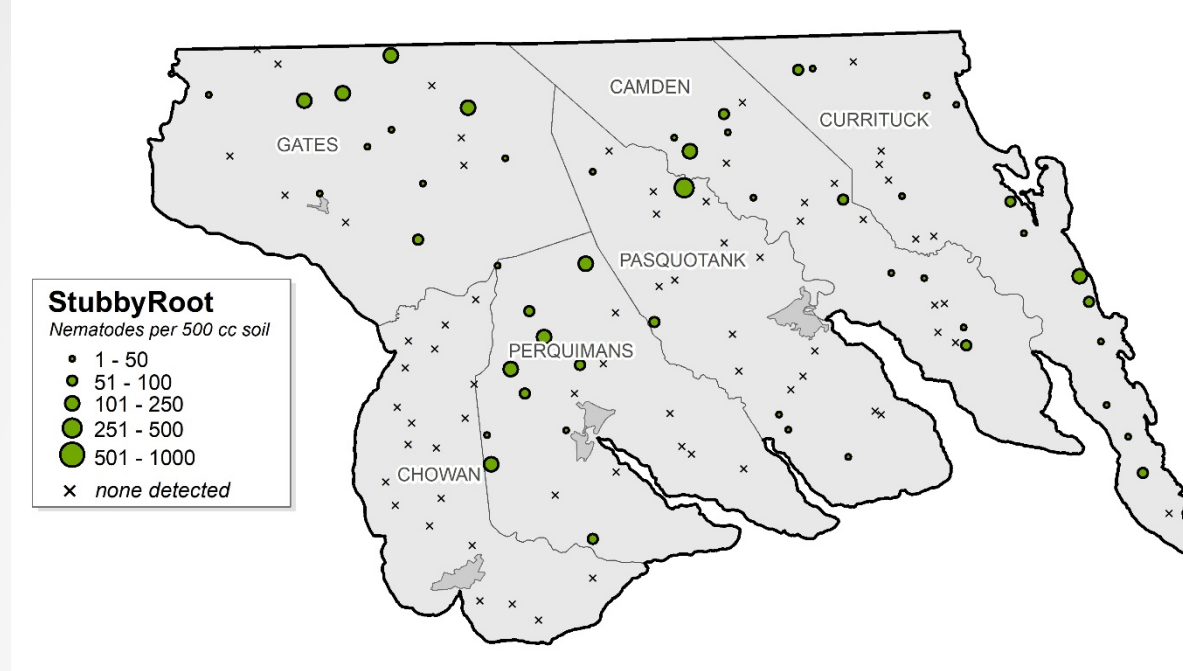
- The Columbia lance nematode (*Hoplolaimus columbus*) is pathogenic to soybean, cotton, and corn, and other crops. This nematode was observed more frequently in eastern counties in the survey region.
- Therefore, growers in this area may want to keep an eye out for damage from this nematode. Columbia lance nematode also tends to be limited in occurrence to sandier soil types.
- Tolerance to the Columbia lance nematode is available in some soybean varieties. These varieties include Northrup King S83-30, Coker 368, Centennial, Hagood, and Maxcy. These soybean varieties are not completely *resistant*, but rather *tolerant* of infection. That is, the nematode can still feed and reproduce on the plants, but significant yield reduction is not observed. This management option can be very useful, but should be approached with caution, as populations could still increase, leading to problems in the next crop. Peanut, tobacco, and small grains are non-host to the Columbia lance nematode and could be considered as rotational options.

## Stunt Nematode



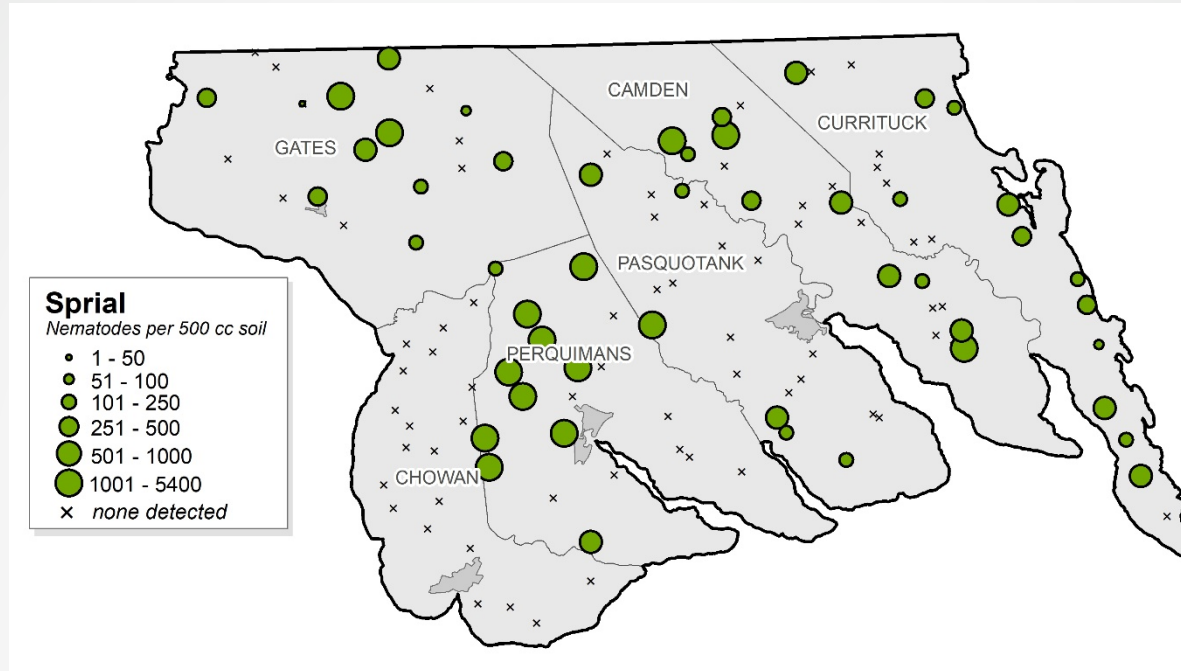
- The stunt nematode (*Tylenchorhynchus* spp.) was observed in several counties in the survey at low to moderate levels, with one sampling location reporting a higher level. Although stunt nematode can parasitize soybean roots, stunt nematode is usually more damaging on corn and tobacco. It has been observed that drought and other crop stresses can make stunt nematode damage worse.

## Stubby Root Nematode



- The stubby root nematode (*Nanidorus*, *Trichodorus* and *Paratrichodorus* spp.) was found in low to moderate levels across the survey region. The threshold for this nematode in soybean is not well understood. It has been observed that drought can make damage from this nematode worse.
- Stubby root nematode is capable of vectoring certain plant viruses, most notably the plant virus that causes Corky Ringspot disease in white potato. Stubby root nematode has a broad host range, including soybean, potato, corn, sorghum, and peanut.
- If a field has suffered problems with plant viruses such as Corky Ringspot in previous years, soil sampling for assessment of stubby root nematode populations may be helpful. Non-fumigant nematicides are recommended over fumigants for suppression of stubby root nematode.

## Spiral Nematode



- The spiral nematode (*Helicotylenchus* spp.) was found very frequently across the survey region. Although this nematode can cause yield loss in soybean, spiral nematode is thought to have a very high threshold compared to other types of plant-parasitic nematodes (such as root-knot, sting, or SCN). However, soil samples with spiral nematode populations measuring in the range of 3,000 to 5,000+ nematodes per 500 cc's soil should be closely monitored for potential crop damage.



## **How to use the survey information and maps**

This nematode survey provides information about:

- What nematode *genera* or types are present in soybean fields in the survey region
- The most frequent nematode types in soybean in the survey region
- The population counts of the nematodes types
- The associated hazard index (risk level) to soybean

You can use this information to know more about the occurrence of different nematode types in your local area and the relative risk these nematodes pose. Performing soil sampling of your farm and individual fields for nematode analysis is warranted in local areas with more frequent occurrence of nematodes, or if you have noticed poor growth previously.

Nematode management plans (such as using a nematicide or a resistant variety where available) should be weighed against the level of risk. Higher hazard index levels should call for more aggressive nematode management plans.