

December 6, 2011

CORN NEMATODES

AGRONOMY TOPIC OF THE WEEK

There is an unseen guest in your corn fields. You may ask yourself are these guests friend or foe, and the answer is both. The “guest” in question in this case is corn nematodes and they have been a presence in soils since before it was used for agricultural purposes. Some species of nematode are beneficial to crop production because they decompose organic matter and cycle nutrients. However, there are several species of nematodes which are serious pests to crops. These species are referred to as plant-parasitic nematodes. Their specially adapted body structures allow them to feed upon living plant cells. These specific nematodes have a hardened, pointed mouth spear called a stylet.

The majority of nematodes that feed on corn tissue are commonly found where ever corn is grown, obviously being more prevalent where corn is planted multiple years in a rotation. These microscopic roundworms are approximately 3/10 to 3/64 inch long, and cannot be seen by the naked eye. The most common species that cause damage to corn are the lesion and needle nematodes, which are both found in much of the Midwest, including Minnesota.

Corn nematodes are classified into one of three categories. The category by which a nematode is defined is based on how they feed on roots. Some nematode species spend most of their time in the soil, while others live mostly in the roots. The first type of corn nematode remains outside of the corn root as the nematode feeds. This type of nematode is referred to as ectoparasitic. A portion of the bodies of semi-endoparasitic nematodes enter the corn roots to feed, but a portion of the nematode remains outside of the root tissue. Lastly, endoparasitic nematodes enter the root of the corn plant completely to feed. Many of these types of nematodes survive in dead root tissue over the winter.

Nematodes can cause damage to the corn plant directly or indirectly. The nematodes feeding may directly harm the plant, or they may cause wounds through which fungi and bacteria can enter the plant and cause secondary rots. Nematodes can also transmit viruses through their feeding. Regardless of the mode of injury, damage caused by corn nematodes can be a significant factor in reducing corn yield.

Symptoms from nematode damage can be hard to generalize because they can vary with the species, number of nematodes present, as well as soil environment factors. Common above ground symptoms include thin stands, uneven plant height, stunted plants, uneven tasseling, leaf yellowing, and small ears and kernels. Other symptoms of roots feeding include swollen roots, lack of fine roots and root branching, and necrotic lesions. The unfortunate part of diagnosing corn nematode damage based on symptomology is that these are not unique and cannot definitively confirm nematode damage. Also once symptoms have been observed, an extent of damage to the plant has occurred and yield potential has already been reduced. The only way to effectively confirm nematode presence and pressure in your field is through the collection and analysis of soil and root samples.

There are many important considerations to keep in mind when scouting and sampling for corn nematodes. Several soil cores should be collected at least 8 inches and ideally 12 inches deep from the root zone of plants exhibiting a range of symptoms. Also keep in mind that some nematodes, called endoparasites, feed entirely from within the roots, so a sample of two or three corn root systems should be submitted for analysis as well. For most plant parasitic nematodes that feed on corn samples should

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be collected mid-season. This is when nematode numbers are likely to be at their greatest and the numbers can be compared to damage thresholds established for corn. The only exception would be if needle nematode damage is suspected, then samples should be collected in the spring or fall. Needle nematodes migrate down into the soil in the middle of summer and may not be recovered from mid-season samples. Place soil and root samples in a moisture-proof bag and submit for processing as soon as possible. Also keep the samples cool until they are sent in for processing. Overheating of the samples will kill the nematodes and the samples will be worthless. Ship the samples early in the week so they are not delayed in a post office over the weekend. Lastly, submitting a companion soil and root sample collected from nearby healthy corn plants can provide a helpful comparison.

If it is determined that the corn crop is being damaged by corn nematodes, there are only a few management strategies that are currently available. They are the use of non-host crops, the use of nematicides, or the recently released seed treatment option, VOTiVO. Neither of these management strategies can be used to minimize damage or rescue the current corn crop. These strategies can be used to reduce future damage of corn crops. Non-host crops such as alfalfa or soybeans will reduce corn nematode population densities. One or two years of growing non-host crops may be sufficient to lower numbers of corn nematodes below the damage thresholds of corn.

Only a few nematicides are currently labeled for use in controlling plant-parasitic nematodes in corn. Keep in mind that damaging populations of these parasitic nematodes often occur in discrete patches or "hot spots". Therefore, field-wide application of these pesticides may not be economical. Research has also shown that the benefits of nematicide use usually do not carry over to future cropping seasons. Using nematicides as a management strategy consequently is a short-term management option.

VOTiVO seed treatment combines one of the most trusted seed-applied insecticides for corn, Poncho, with the most revolutionary, complete nematode protection on the seed. The result is a powerful seed treatment for corn that protects early season seedlings and roots from numerous insect and nematode pests. The product was developed by Bayer Crop Science and employs a new biological mode of action with a unique bacteria strain that lives and grows with young roots, creating a living barrier that prevents important nematode species from reaching the roots. The Poncho/VOTiVO combination also provides control of many critical early season insect pests.

Visit with your Central Valley Agronomist to discuss if corn nematodes may be a limiting factor in your corn fields. Now is a critical time during seed selection to make the proactive choice to protect every bushel by considering VOTiVO seed treatment.

Attached are local soil sample results from Blooming Prairie, MN taken from a field that was first year corn on corn. The field was sampled in August 2011 and the samples were taken from a side-by-side of seed treated with and without VOTiVO. Some of the species present were at or below threshold, but many of the potentially yield reducing species were detected at counts far exceeding the established threshold.

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Parasitic Corn Nematode Test

Location: Blooming Prairie, MN

Date: 8/24/11

Nematode Species	Level Detected	Units	Threshold	Units
Lesion (Pratylenchus)	266	#/100 cc	25-30	#/100 cc
Lance (Hopolaimus)	26	#/100 cc	25-30	#/100 cc
Stunt (Tylenchorhynchus)	133	#/100 cc	200	#/100 cc
Spiral (Helicotylenchus/Scutellonema)	1968	#/100 cc	700	#/100 cc

Hybrid	Seed Treatment	Soil Insecticide	Pounds of Grain	% Grain Moisture	Row Width	Row Length	# of Rows	Harvest Population	Yield Bu/A	Rank	Test WT Lbs/Bu
DKC48-12 GENSS	A250	None	2886	17.8	30	1260	4		172.3	4	55.9
DKC48-12 GENSS	Votivo A500	None	3077	17.8	30	1260	4		183.7	1	55.8

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